Service manual

Room airconditioner

Split Wall-Mounted Type



NOTE:

Before servicing the unit, please read this first Always contact with your service center if meet problem.

Table of Contents

1. Summary

1.1 indoor unit





Model 38B　　　　**model 85**

1.2 outdoor unit



9000BTU



12000 ~ 18000 BTU

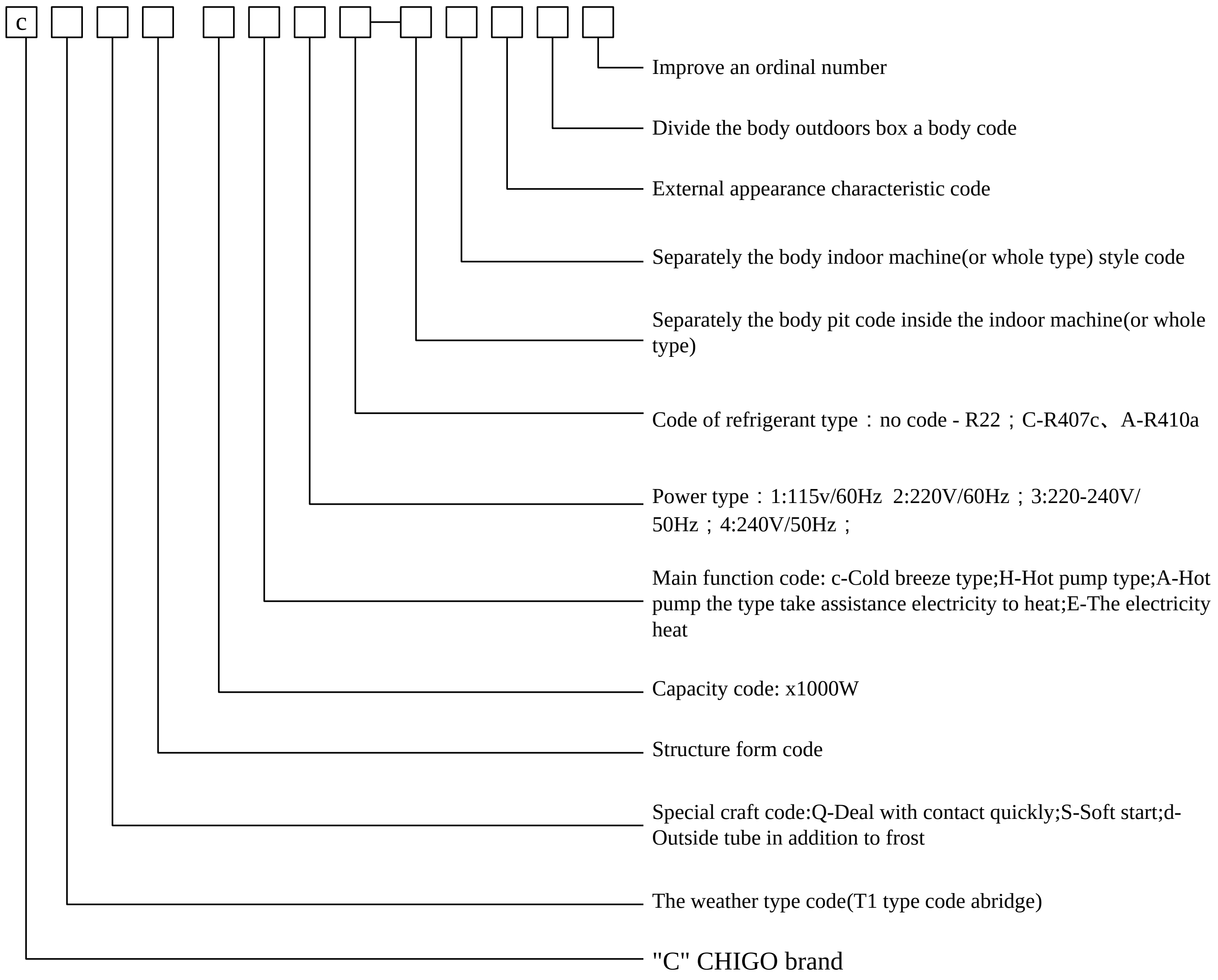


22000 BTU



24000 ~ 26000 BTU

2、Model explaining



Such as: CS-25C3A-V85AY1

T1 climate type,wall split type air conditioner, cooling capacity is 2500W，power is 220V～/50Hz/1PH，refrigeration is R410A,the kernel of indoor unit is fresh 98，the pattern no. is 85，first time design, outdoor unit is 1HP of 2003 year。

Indoor unit modle is：CS-25C3A-V85A，outdoor unit model is：CS-25C3A-Y1。

3. Attention of installation

3.1 Safety Precaution

■To prevent injury to the user or other people and property damage, the following instructions must be followed.

■Incorrect operation due to ignoring instruction will cause harm or damage.

■Before service unit, be sure to read this service manual at first.

3.2 Warning

>Installation

■Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.

There is risk of fire or electric shock.

■For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized service center.

Do not disassemble or repair the product, there is risk of fire or electric shock.

■Always ground the product.

There is risk of fire or electric shock.

■Install the panel and the cover of control box securely.

There is risk of fire of electric shock.

■Always install a dedicated circuit and breaker.

Improper wiring or installation may cause fore or electric shock.

■Use the correctly rated breaker of fuse.

There is risk of fire or electric shock.

■Do not modify or extend the power cable.

There is risk of fire or electric shock.

■Do not install, remove, or reinstall the unit by yourself (customer).

There is risk of fire, electric shock, explosion, or injury.

■Be caution when unpacking and installing the product.

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

■ For installation, always contact the dealer or an Authorized service center.

There is risk of fire, electric shock, explosion, or injury.

■Do not install the product on a defective installation stand.

It may cause injury, accident, or damage to the product.

■Be sure the installation area does not deteriorate with age.

If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

■Do not let the air conditioner run for a long time when the humidity is very high and a door or a windows is left open.

Moisture may condense and wet or damage furniture.

■Take care to ensure that power cable could not be pulled out or damaged during operation.

There is risk of fire or electric shock.

■ Do not place anything on the power cable.

There is risk of fire or electric shock.

■Do not plug or unplug the power supply plug during operation.

There is risk of fire or electric shock.

■Do not touch (operation) the product with wet hands.

There is risk of fire or electric shock.

■Do not place a heater or other appliance near the power cable.

There is risk of fire and electric shock.

■Do not allow water to run into electric parts.

It may cause fire, failure of the product, or electric shock.

■Do not store or use flammable gas or combustible near the product.

There is risk of fire or failure of product.

■ Do not use the product in a tightly closed space for a long time.

Oxygen deficiency could occur.

■When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.

Do not use the telephone or turn switches on or off. There is risk of explosion or fire.

■If strange sounds, or small or smoke comes from product. Turn the breaker off or disconnect the power supply cable.

There is risk of electric shock or fire.

■Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.

There is risk of property damage, failure of product, or electric shock.

■Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

There is risk of physical injury, electric shock, or product failure.

■When the product is soaked (flooded or submerged), contact an Authorized service center.

There is risk of fire or electric shock.

■Be caution that water could not enter the product.

There is risk of fire, electric shock, or product damage.

■Ventilate the product from time to time when operating it together with a stove, etc.

There is risk of fire or electric shock.

■Turn the main power off when cleaning or maintaining the product.

There is risk of electric shock.

■When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.

There is risk of product damage or failure, or unintended operation.

■Take care to ensure that nobody could step on or fall onto the outdoor unit.

This could result in personal injury and product damage.

›CAUTION

■Always check for gas (refrigerant) leakage after installation or repair of product.

Low refrigerant levels may cause failure of product.

■Install the drain hose to ensure that water is drained away properly.

A bad connection may cause water leakage.

■Keep level even when installing the product.

To avoid vibration of water leakage.

■Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

It may cause a problem for your neighbors.

■Use two or more people to lift and transport the product.

Avoid personal injury.

■Do not install the product where it will be exposed to sea wind (salt spray) directly.

It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

›Operational

■Do not expose the skin directly to cool air for long periods of time. (Do not sit in the draft).

This could harm to your health.

■ Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigerant system.

There is risk of damage or loss of property.

■ Do not block the inlet or outlet of air flow.

It may cause product failure.

■Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.

There is risk of fire, electric shock, or damage to the plastic parts of the product.

■ Do not touch the metal parts of the product when removing the air filter. They are very sharp.

There is risk of personal injury.

■ Do not step on pr put anything on the product. (outdoor units)

There is risk of personal injury and failure of product.

■Always insert the filter securely. Clean the filter every two weeks or more often if necessary.

A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

■Do not insert hands or other object through air inlet or outlet while the product is operated.

There are sharp and moving parts that could cause personal injury.

■ Do not drink the water drained from the product.

It is not sanitary could cause serious health issues.

■Use a firm stool or ladder when cleaning or maintaining the product.

Be careful and avoid personal injury.

■Replace the all batteries in the remote control with new ones of the same type. Do not mix old and mew batteries or different types of batteries.

There is risk of fire or explosion.

■ Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.

They may burn of explode.

■ If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote of the batteries have leaked.

The chemical in batteries could cause burns or other health hazards.

3.3 Installation details

■ Wrench torque sheet for installation

Outside diameter		Torque
mm	inch	Kg.m
φ6.35	1/4	1.8
φ9.52	3/8	4.2
φ12.7	1/2	5.5
φ15.88	5/8	6.6
φ19.05	3/4	6.6

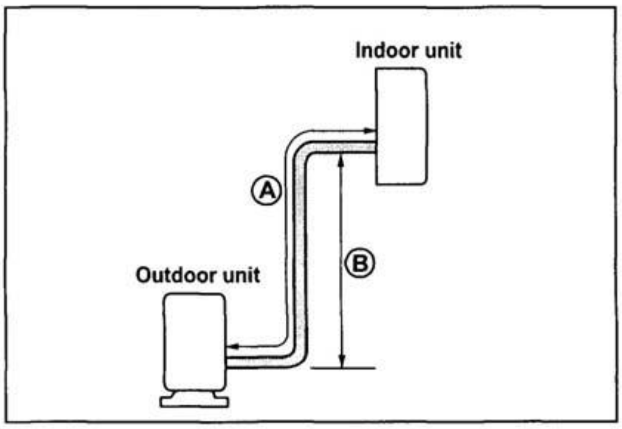
■Connecting the cables

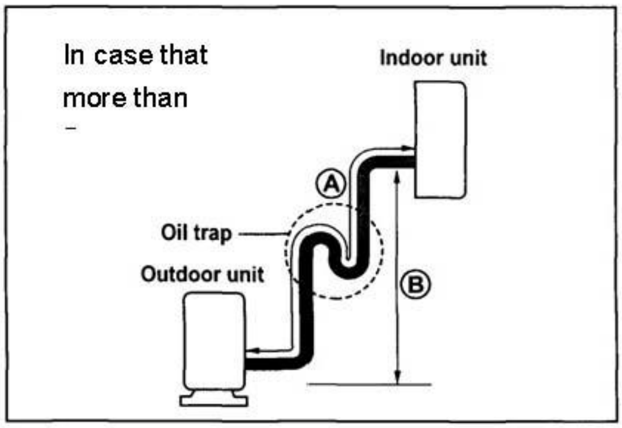
The power cord of connect should be selected according to the following specifications sheet.

	Grade					
Unit	7K	9K	12K	18K	24K	28K
mm2	1.0	1.0	1.5	2.5	2.5	2.5

■ Pipe length and the elevation

Capacity	Pipe size		Standard length (m)	Max. Elevation	Max. Elevation	Additional refrigerant
Btu/h	GAS	LIQUID		B (m)	A (m)	(g/m)
9K-12K	3/8'' (φ9.52)	1/4'' (φ6.35)	3.5	5	10	30
18K-22K	1/2'' (φ12.7)	1/4'' (φ6.35)	4	10	15	30
24K-28K	5/8'' (φ15.88)	3/8'' (φ9.52)	5	15	20	65



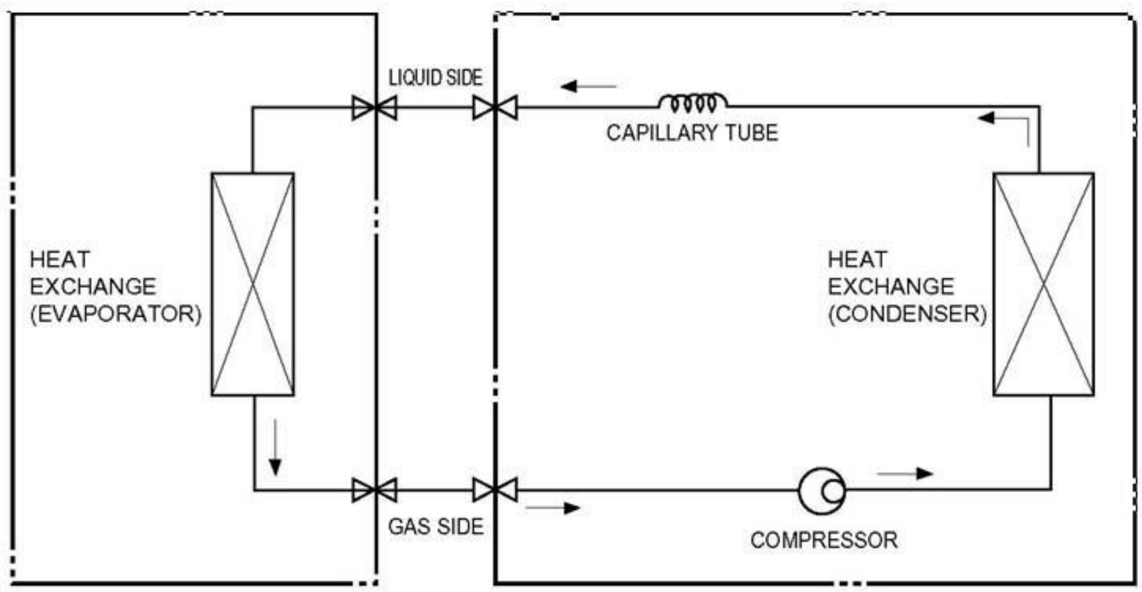


Caution:Capacity is base on standard length and maximum allowance length is base of reliability.Oil trap should be install per 5-7 meters.

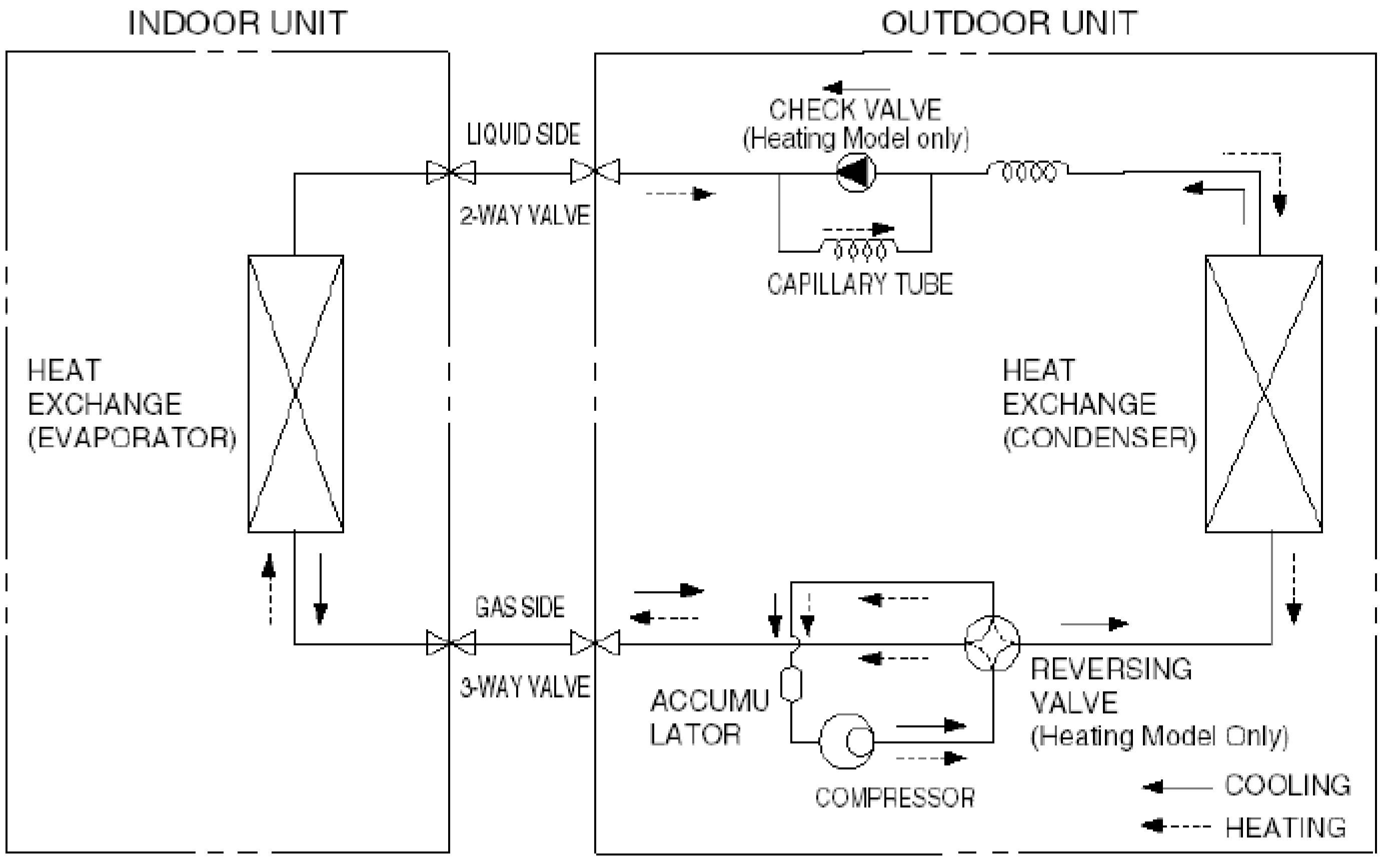
4、Indoor unit and outdoor unit explosion diagram and spare parts list(see explosion diagram file)

5. Refrigerant cycle diagram

5.1 Cooling only



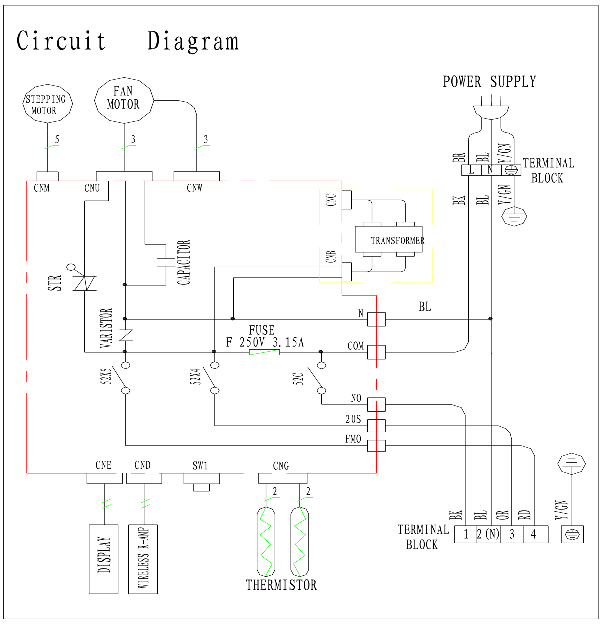
5.2 Heat pump mode

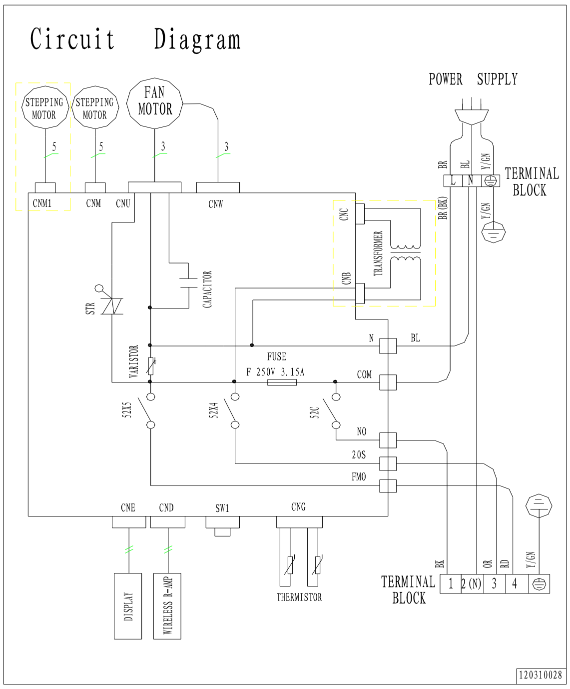


6. Specifications (see spec sheet)

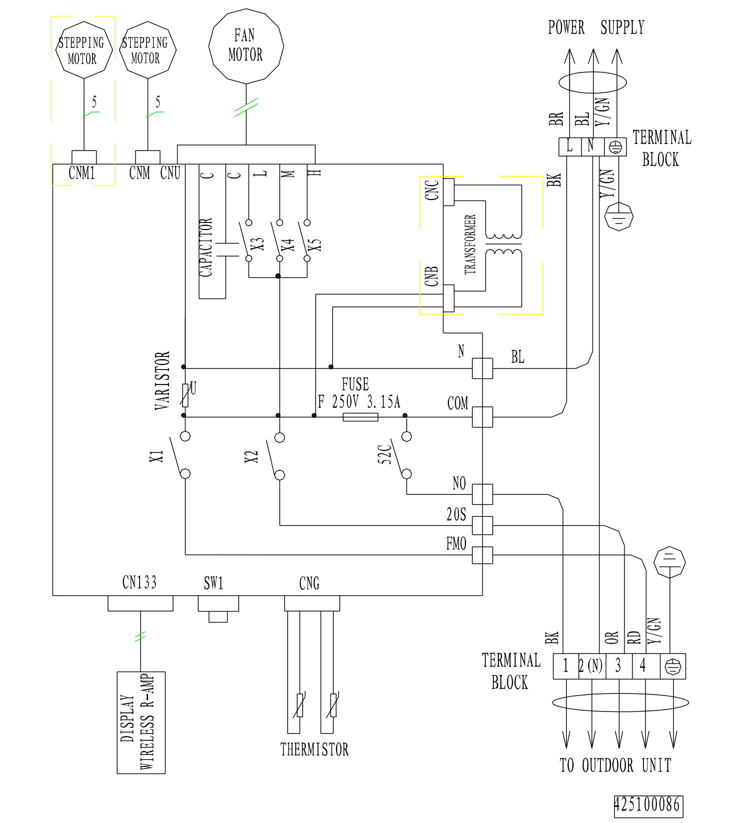
7.Wiring diagrams

7.1Indoor unit

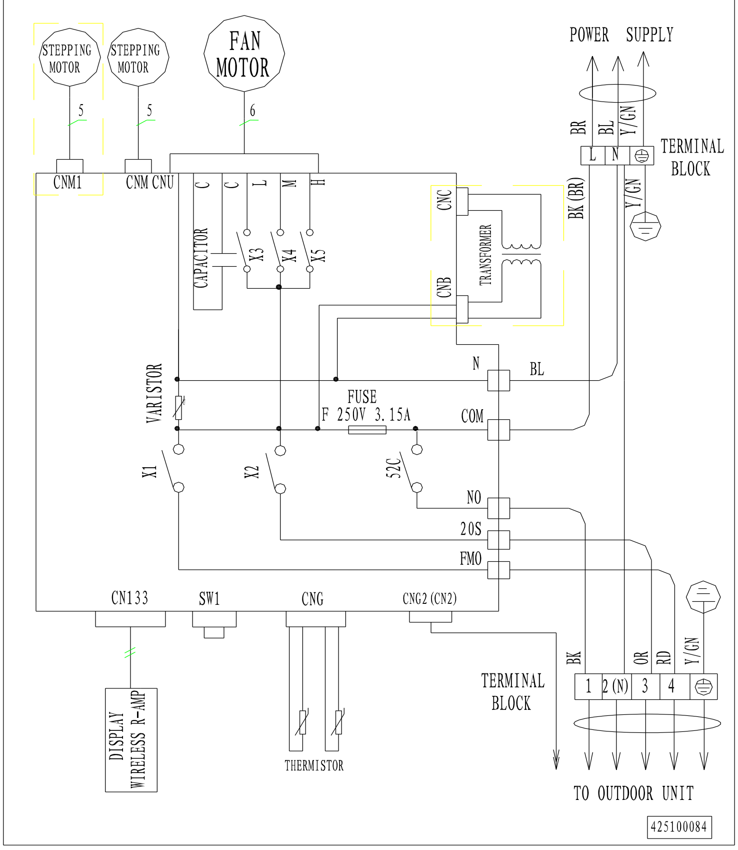




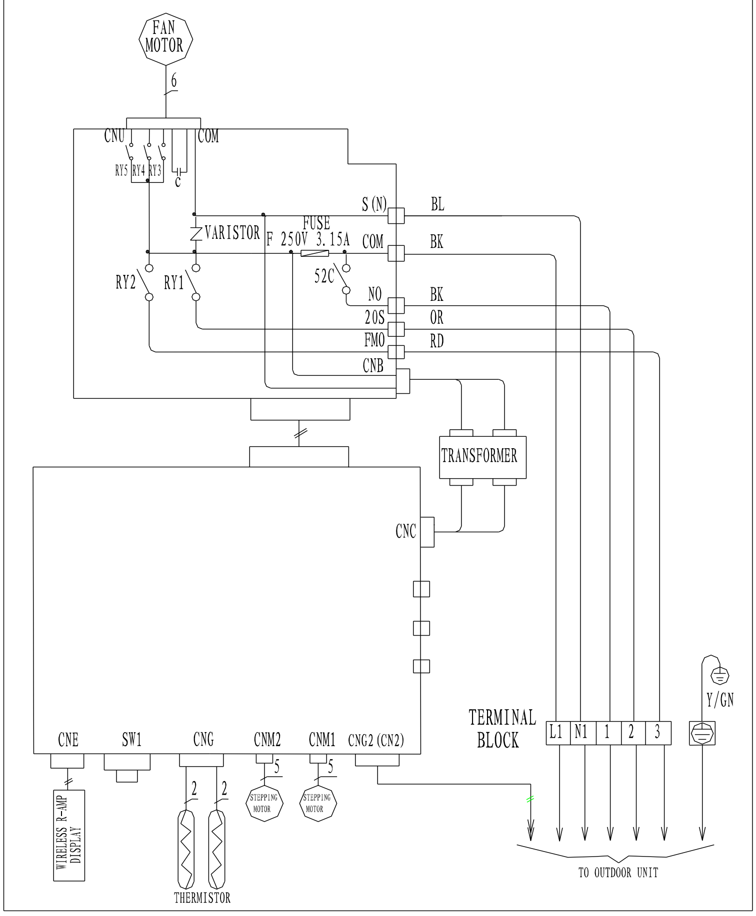
Circuit Diagram



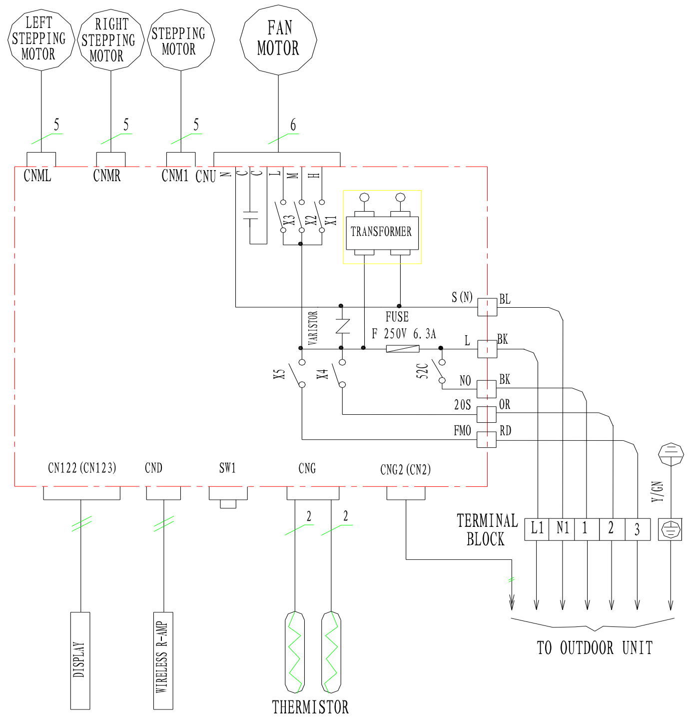
Circuit Diagram



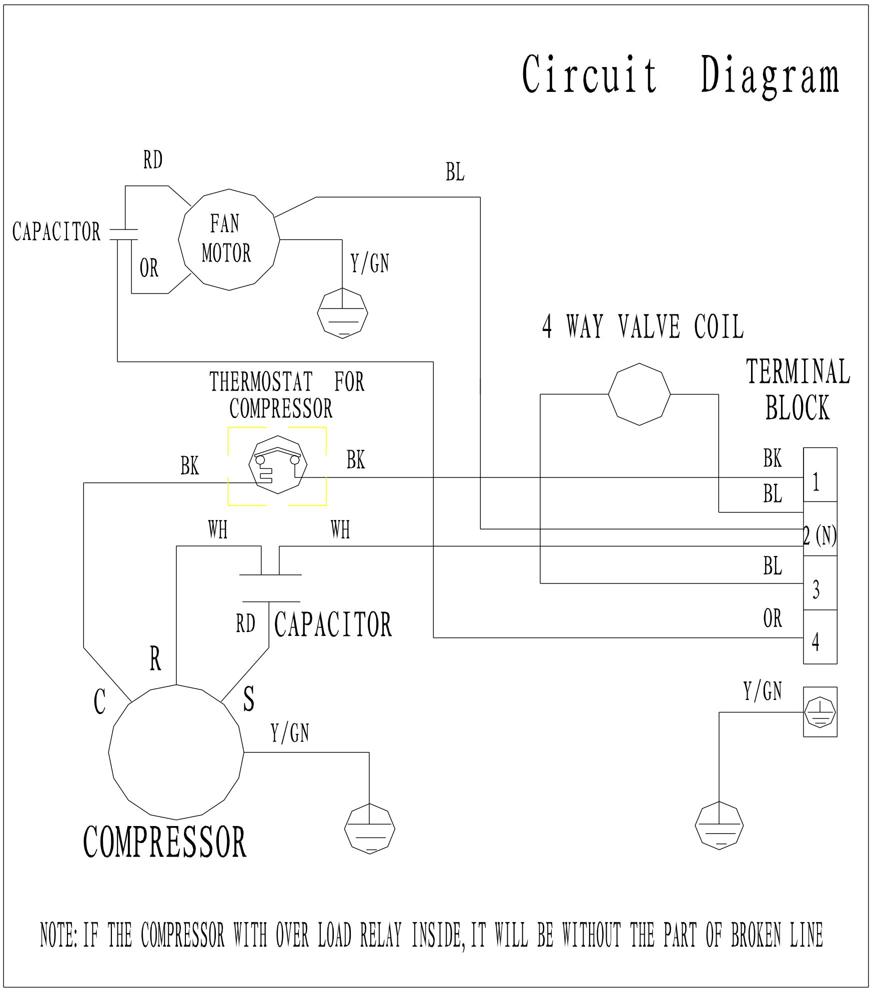
Circuit Diagram

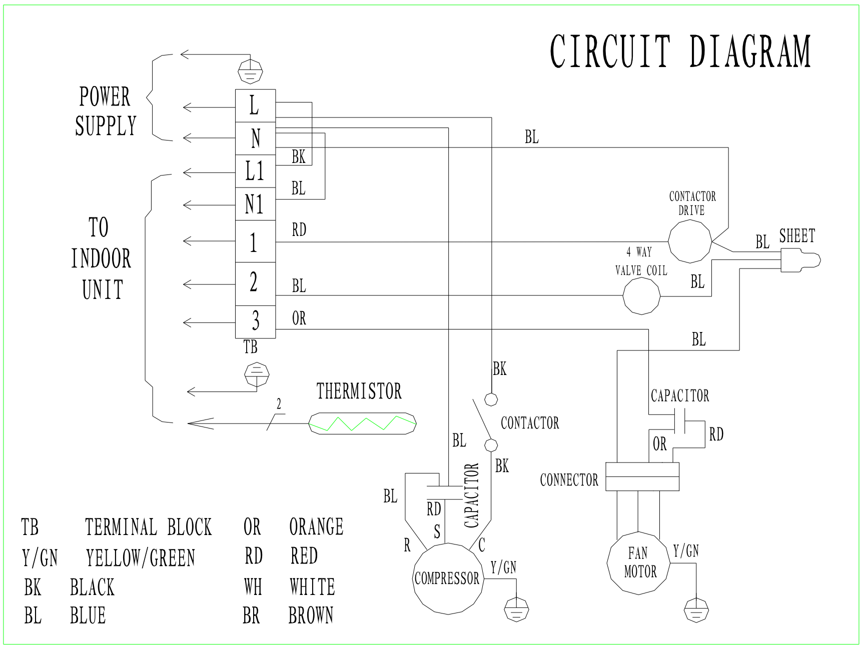


Circuit Diagram



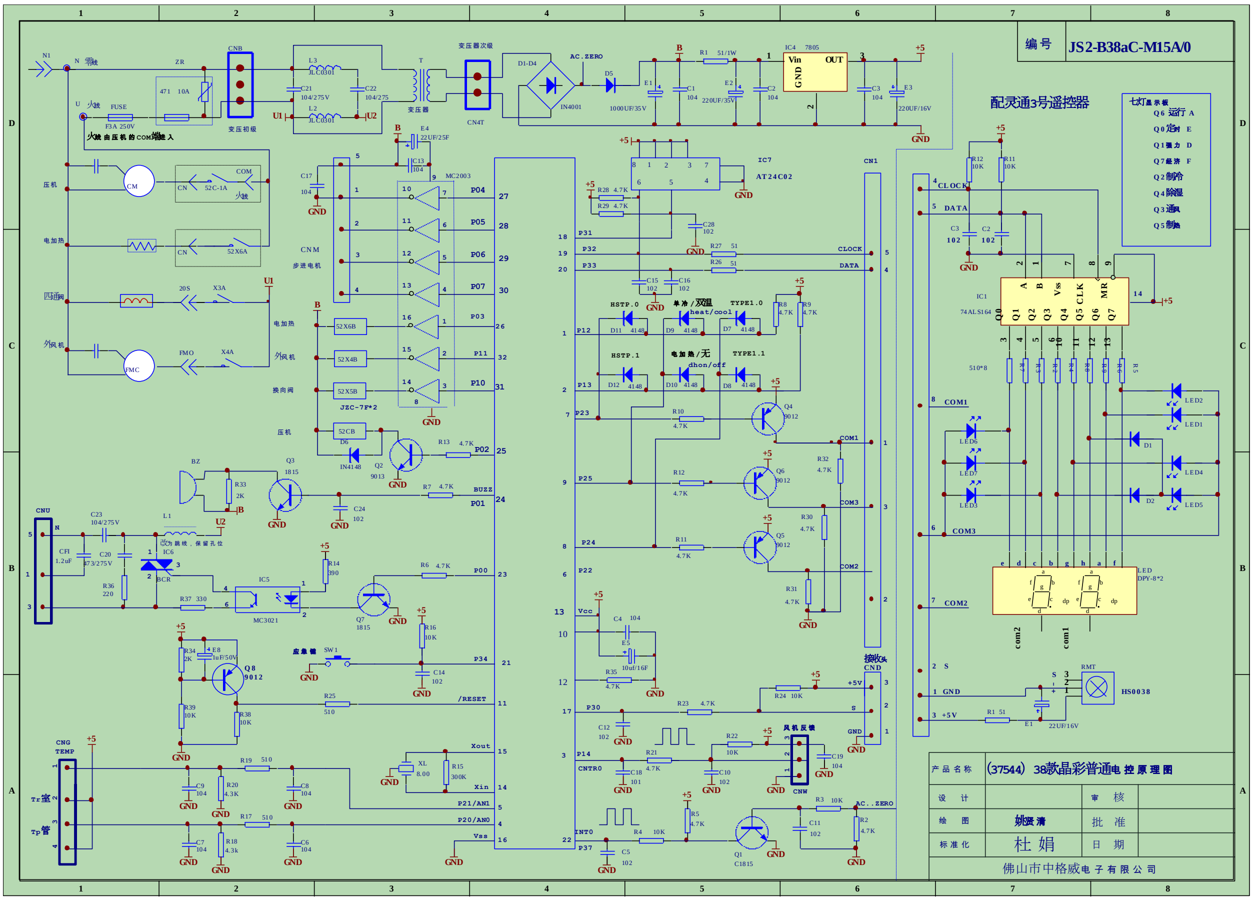
7.2 Outdoor unit



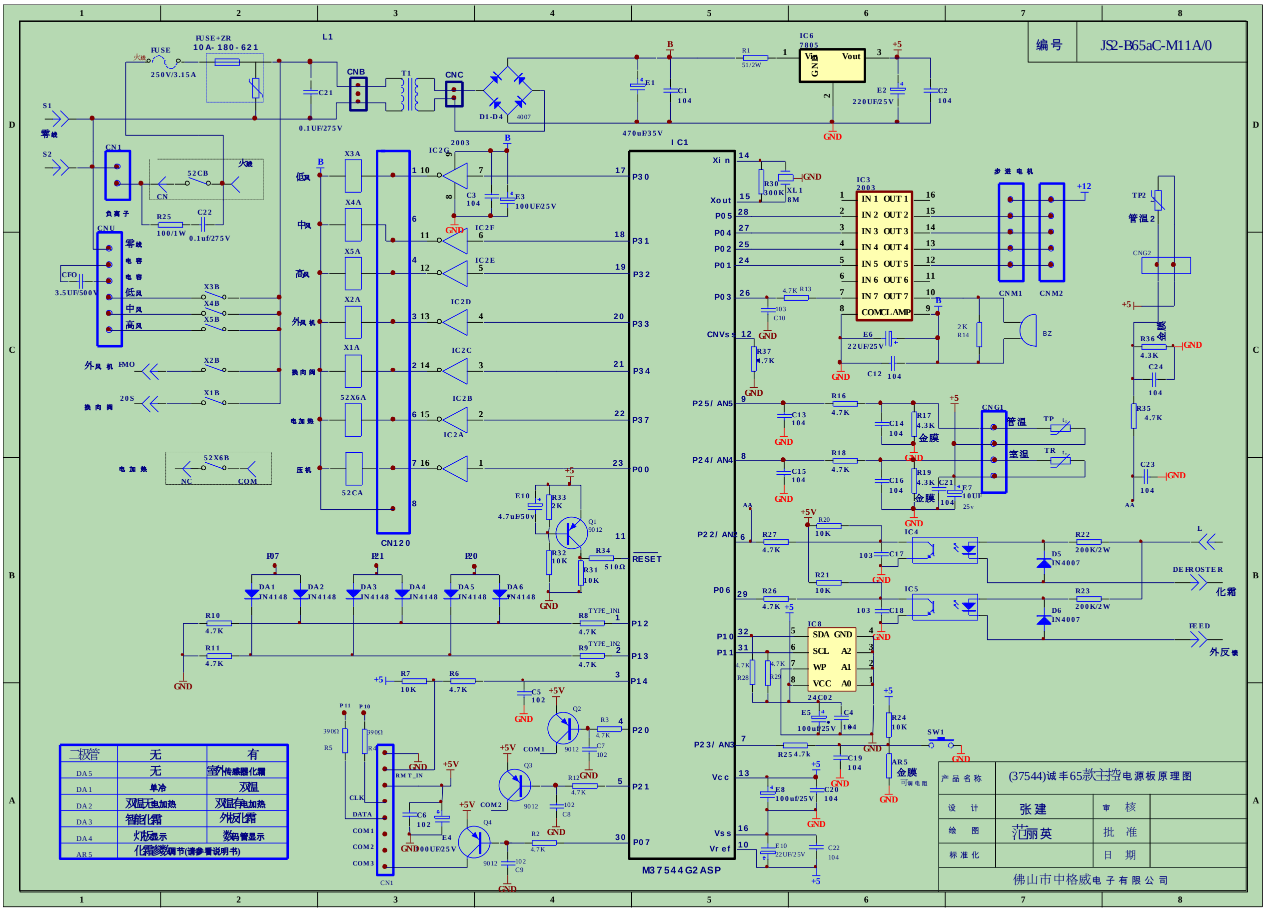


8.PCB principle chart

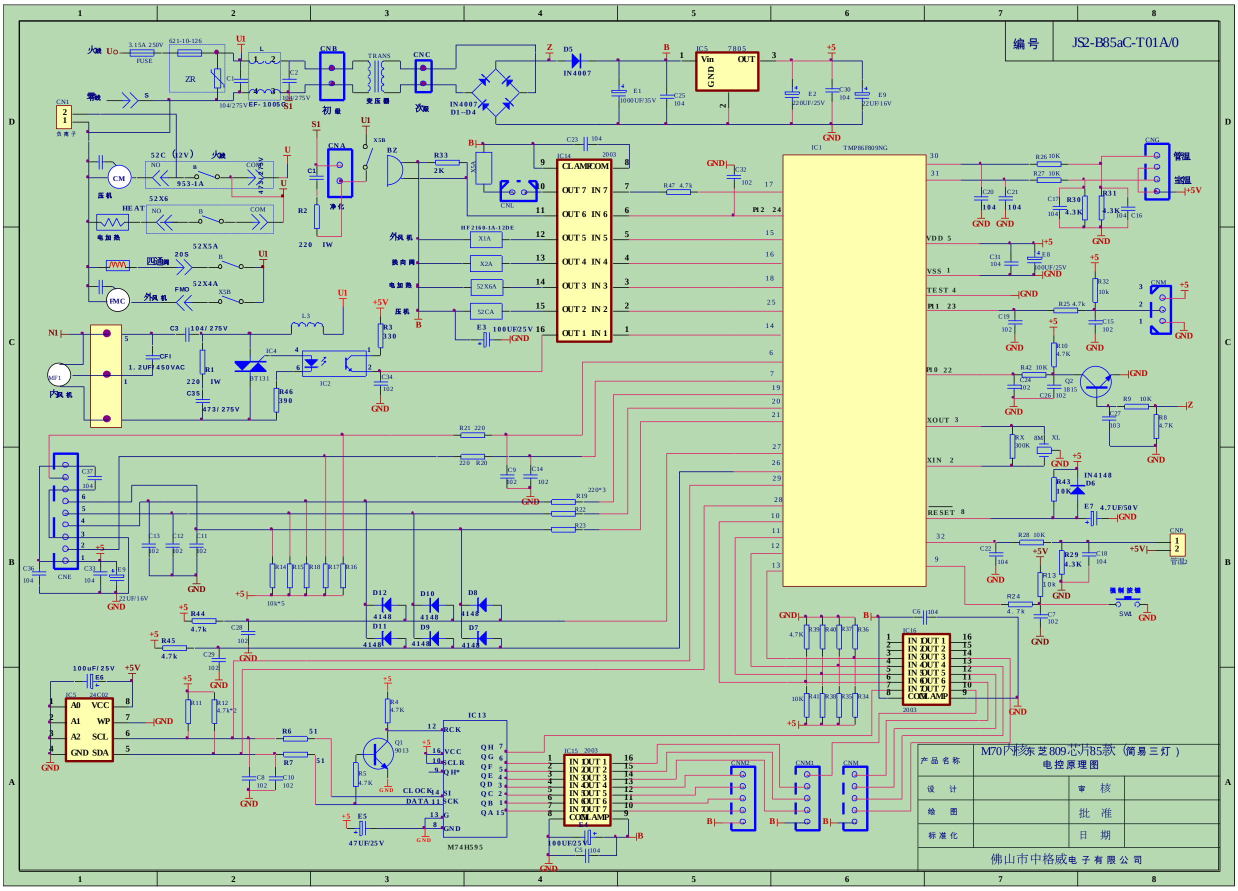
8.1、38 section of crystal color ordinary schematic diagram



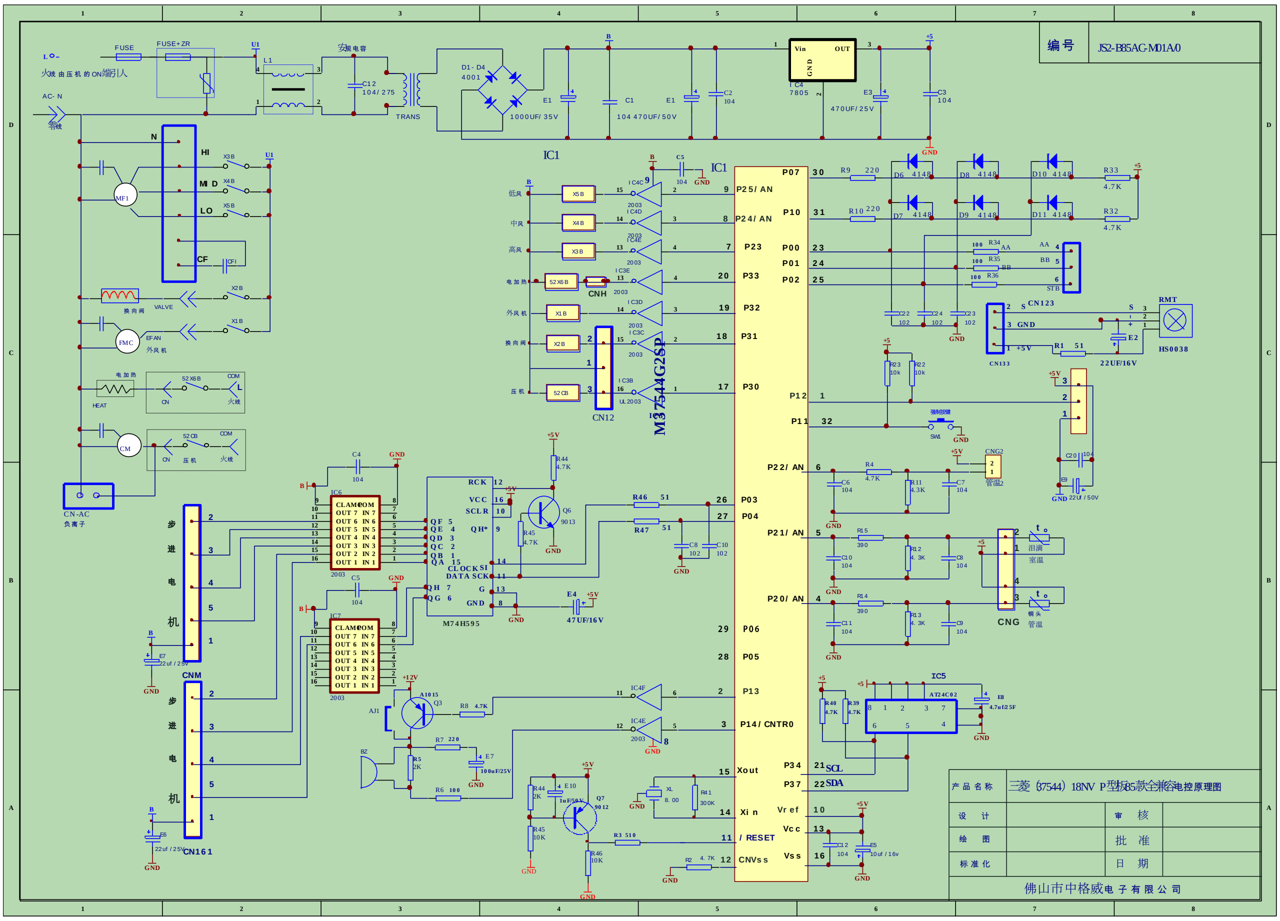
8.2、65 Mitsubishi main chip schematic diagram



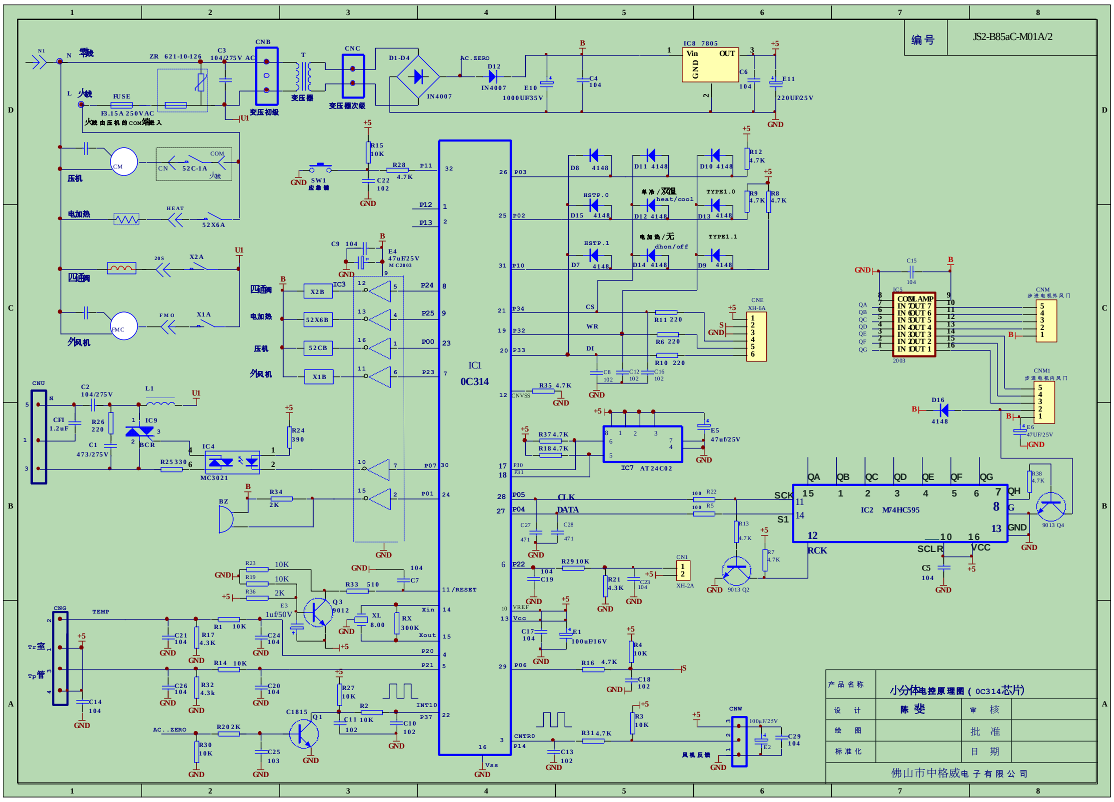
8.3、85 section of schematic diagrams



8.4、Three water chestnut 18NV 85 section of entire compatible electrically controlled schematic diagrams



8.5、Mitsubishi Jin dynasty 85 model of simple three lamp electrically controlled motherboards



9. PCB function:

NOTE: Ts is the set temperature, Tr is indoor room temperature, TP1 is indoor coil pipe temperature, TP2 is outdoor coil pipe temperature.

Display panel

[1]only two LED

①running lamp(green)：power on light, flash one time/ one second during anti cooled wind.

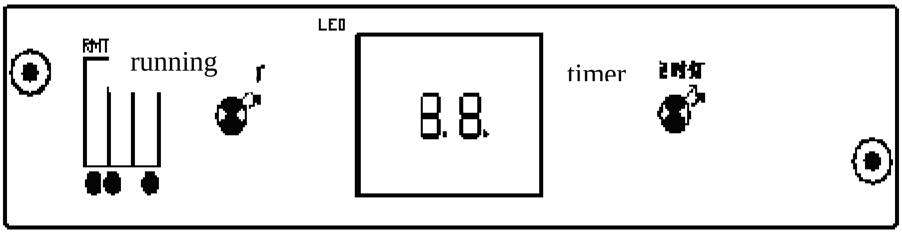
②timer lamp(yellow)：only light at timer state.

[2]eleven LED

① running lamp(green)：power on light, flash one time/ one second during anti cooled wind.

②temperature lamp(green)：16～31℃ set temp. and room temp. display, light is set temp. flash is set temp.

[3]two LED and two 8LED



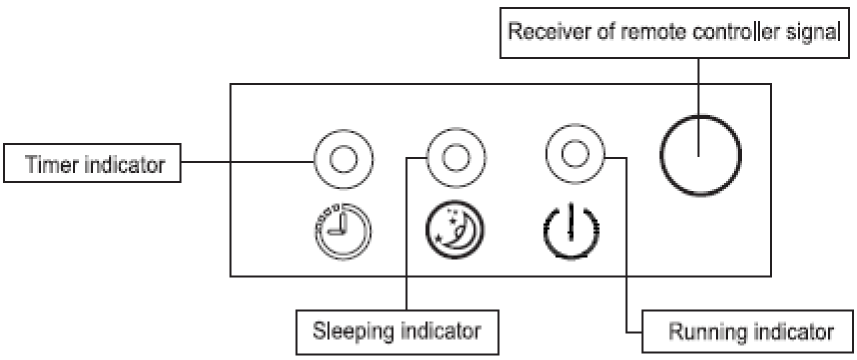
① running lamp(green)：power on light, flash one time/ one second during anti cooled wind.

② timer lamp(yellow)：only light at timer state.

③8LED display set temp., also it can display timer time and failure code.

[4]LED multi-colour panel

①according to display mode: dehumidification, cooling, ventilation, heating, auto, sleep, fan speed, swing, timer, indoor fan running.



Cooling

- Start up the compressor: when the room temperature is more than Ts+1℃, compressor → start-up

- Shut down the compressor: when the room temperature is less than or equal to the set temperature Ts-1℃, compressor → shutdown

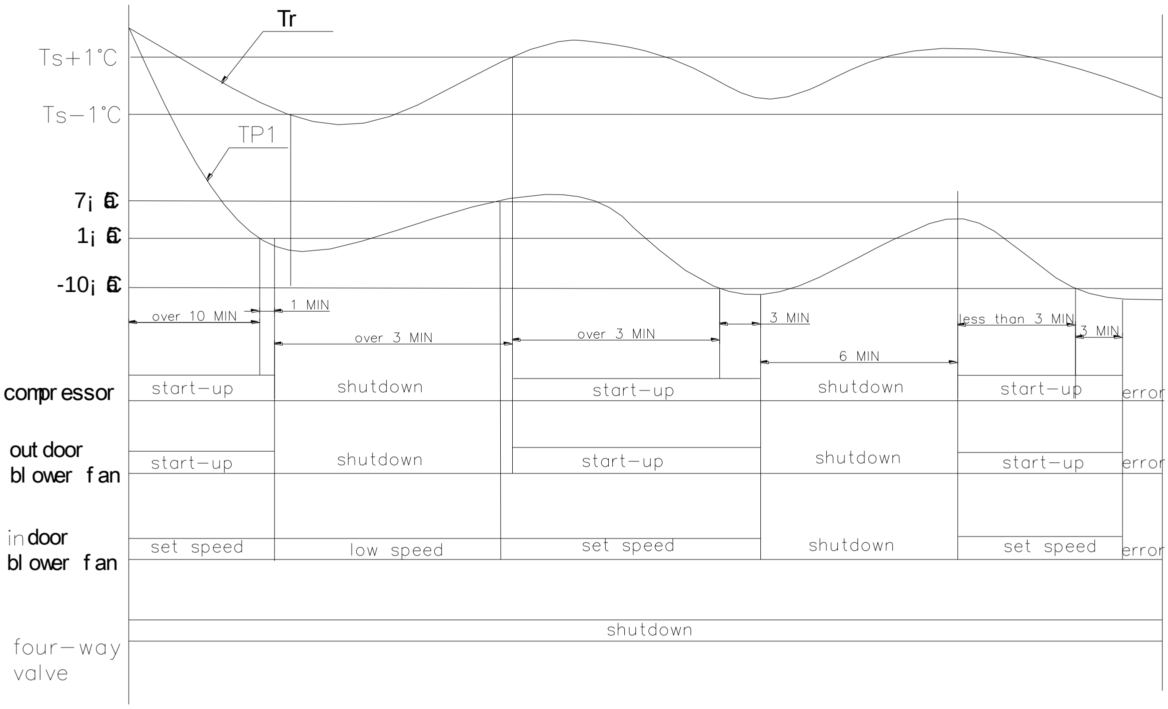
- When the temperature of coil pipe of the indoor units is less than or equal to 1℃ for one minute and the compressor has continuous run for more than ten minutes, the compressor and outdoor blower fan shut down through the electric control board and the indoor blower fan is running at low speed.

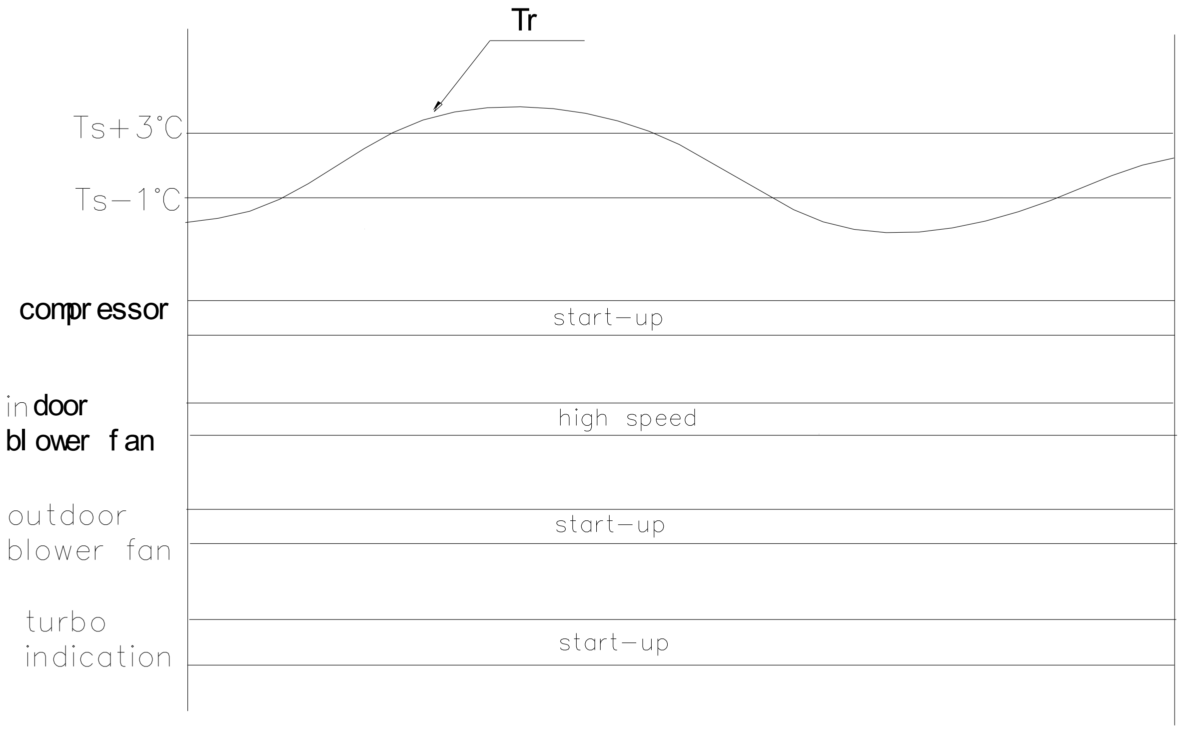
- When the temperature of coil pipe of the indoor units is more than or equal to 7℃ and the compressor has shutdown for more than three minutes, the compressor and outdoor blower fan start to run and the indoor blower fan is running at set speed.

- When the temperature of coil pipe of the indoor units is equal to or less than -10℃ for three minutes in the compressor has continuous run for three minutes, the compressor, indoor and outdoor blower fans and swinging wind shut down. Restart up six minutes later; if the above situations appear again within six minutes, all the outputs are shut down through the electric control board and display failure.

- When you press turbo button of remote, the air conditioner enter turbo running, compressor and outdoor blower fan turn on all along, indoor blower fan run at high speed, turbo indication is light.

- After the compressor runs five minutes, the lamp flashes 4 times per six seconds or display E4 if the temperature of indoor coil pips is more than 25℃ in the continuous 20 minutes. The controller will automatically shut down if the temperature of indoor coil pips is more than 25℃ in another continuous 20 minutes, that is the abnormality protection of outdoor units and the indicator lamp keeps its former state of flashing. If the temperature of indoor coil pips is less than 25℃ in the second 20 minutes or the compressor shuts down, the electric control board will store to the normal display and the time is restarted when starting up the compressor next time.





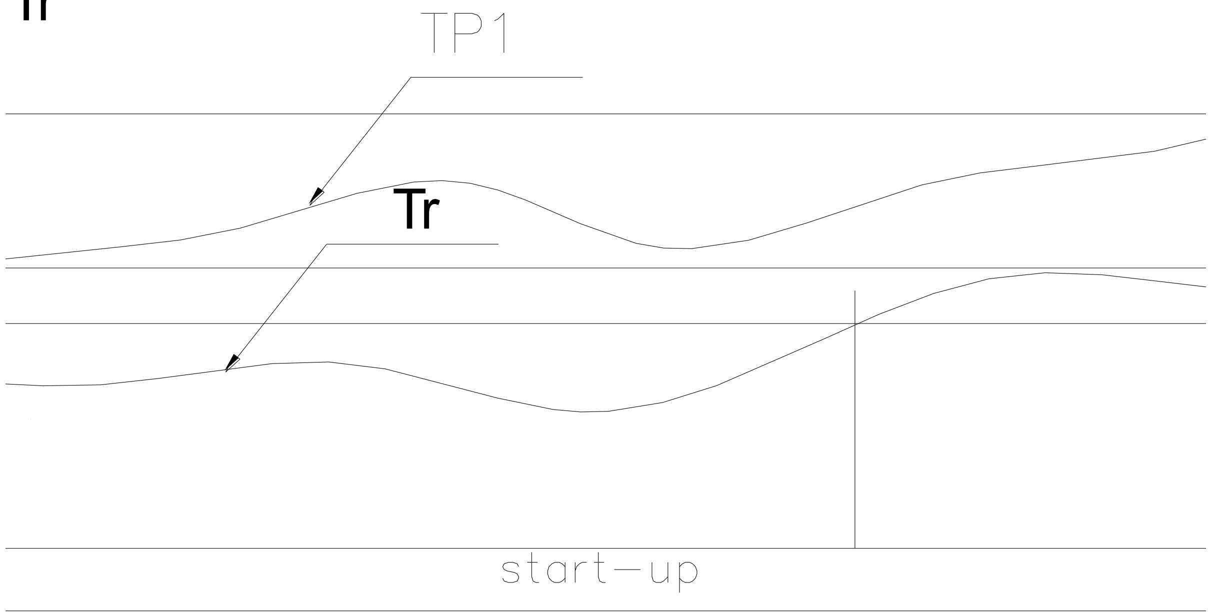
Heating (only applicable to heat pump units)

- Start up the compressor: when the room temperature is less than Ts-1℃, compressor → start-up
- Shut down the compressor: when the room temperature is more than or equal to the set temperature Ts+3℃,

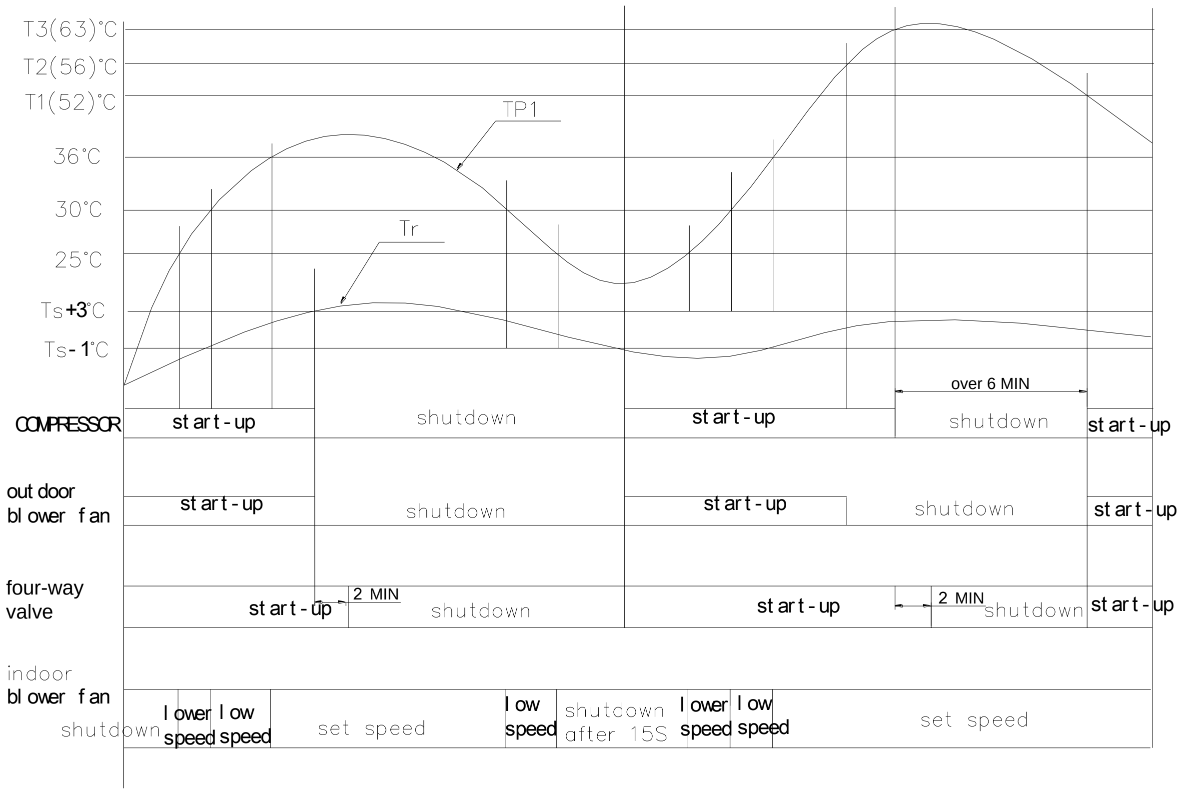
compressor → shutdown

- The electric heating start-up in the heating mode shall meet the following conditions: ① start up the compressor and indoor blower fan ② none defrost ③ TP1< 49℃ ④Tr ≤20℃.
- The electric heating shutdown in the heating mode shall meet one of the following conditions: ① shutdown indoor blower fan ② Tr ≥ 23℃ ③ TP1≥50℃.
- In the heating mode, the indoor flower fan can be set as high/ medium/ low /automatic running mode by remote control however the anti cool air function is prior. In the heating mode, the anti cool air control function is to control shutdown of the indoor blower fan by detecting the temperature of coil pipe of evaporator so as to attain the purpose of preventing cold air from blowing.
- For the waste heat emission function in the heating mode, in principle, the indoor blower fan shall be on for fifteen seconds after the electric heating is closed.
- When the temperature of coil pipe of indoor units is more than or equal to 56℃, the outdoor blower fan shuts down and it enters the overload protection; when the temperature of coil pipe of indoor units is less than or equal to 52℃, the outdoor blower fan starts up and it exit the overload protection.
- When the temperature of coil pipe of indoor units rises to 63℃, the compressor and outdoor blower fan are closed and two minutes later, the change valve is closed. The indoor blower fan is running at the set speed. Restart up six minutes later; if the above situations appear again within ten minutes, all the outputs are shut down through the electric control board and display failure.
- When you press turbo button of remote, the air conditioner enter turbo running, compressor ,outdoor blower fan and four-way valve turn on all along, indoor blower fan run at high speed and it must meet start condition, turbo indication is light.
- After the compressor runs five minutes, the lamp flashes 4 times per six seconds or display E4 if the temperature of indoor coil pips is less than 30℃ (heating) in the continuous 20 minutes. The controller will automatically shut down if the temperature of indoor coil pips is less than 30℃ in another continuous 20 minutes, that is the abnormality protection of outdoor units and the indicator lamp keeps its former state of flashing.

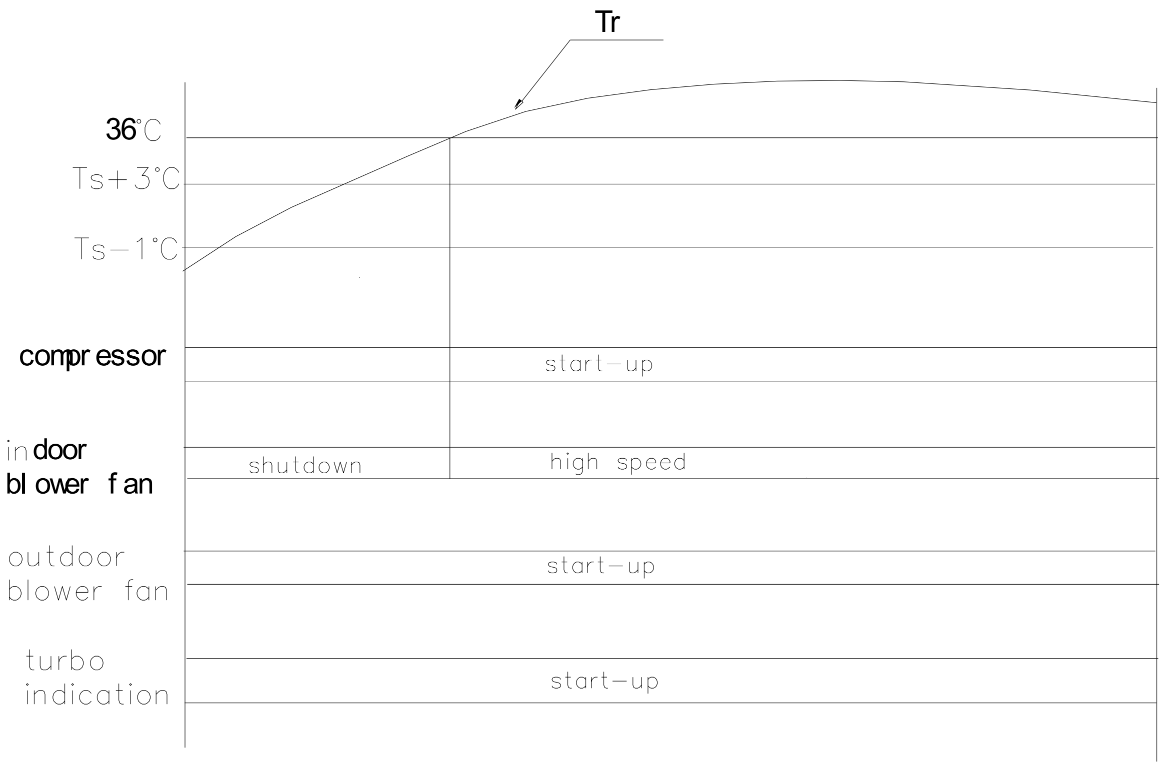
Tr



TP1
Tr
start-up



T3(63)°C
T2(56)°C
T1(52)°C
36°C
30°C
25°C
Ts+3°C
Ts-1°C
TP1
Tr
over 6 MIN
COMPRESSOR
start-up
shutdown
start-up
shutdown
start-up
out door blower fan
start-up
shutdown
start-up
shutdown
start-up
four-way valve
start-up
2 MIN
shutdown
start-up
2 MIN
shutdown
start-up
indoor blower fan
shutdown
lower speed
low speed
set speed
low speed
shutdown after 15S
lower speed
low speed
set speed



Defrost (only applicable to the heating mode)

1. the intelligent defrost

In the heating mode, the electric control board checks and compares the temperature of indoor room and indoor coil pipe after the compressor works for a while; judge whether the outdoor heat exchanger part is frosted or not according to conditions such as the change of indoor coil pipe temperature; if it is judged as frosted, it automatically enters defrosting process. When defrosting, close the indoor and outdoor blower fan and four-way valve.

2. Outdoor PCB for defrost.

In the heating mode, the unit defrost by outdoor control board：

①unit start defrost shall all meet the following conditions：

a、compressor continuous running over 7 minutes；

b、defrost relay shut off；(-5℃)

c、compressor cumulate running time over 50 minutes.；

②first defrost interval time is 50 minutes, later defrost interval time decided by last defrost time.

Defrost time(minute)	Next defrost interval time(minute)
15	30
10--15	40
7--10	60
3--7	70

≤3	80

（2）end defrost condition(meet one of follows)

a、defrost time have fifteen minutes.

b、defrost relay turn on；(＞8℃)

c、press ON/OFF key in defrost process.

3. Outdoor sensor for defrost

① unit start defrost shall meet one of the following conditions：

a. compressor cumulate running time over 30 minutes and it continuous running over 3 minutes, the temperature of coil pipe of the outdoor units is equal to or less than -15℃ for one minutes (Tp_2≤-15℃).

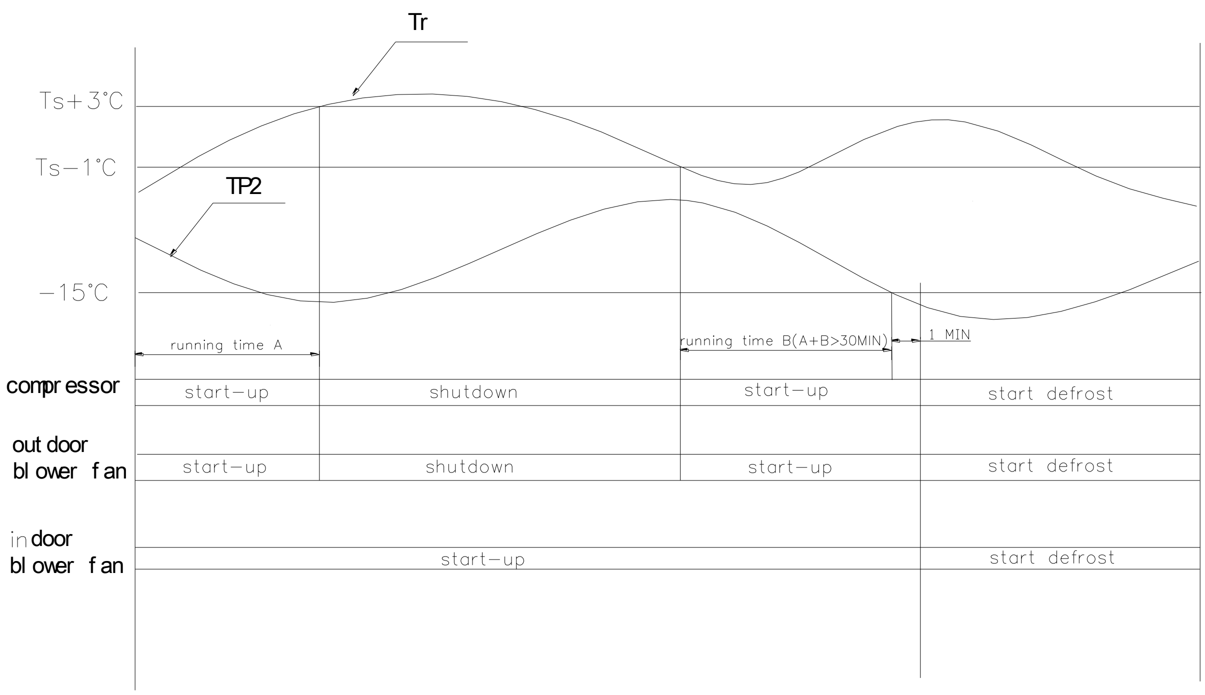
b. compressor cumulate running time over 40 minutes and it continuous running over 3 minutes, the temperature of coil pipe of the outdoor units is equal to or less than -5℃ for one minutes (Tp_2≤-15℃).

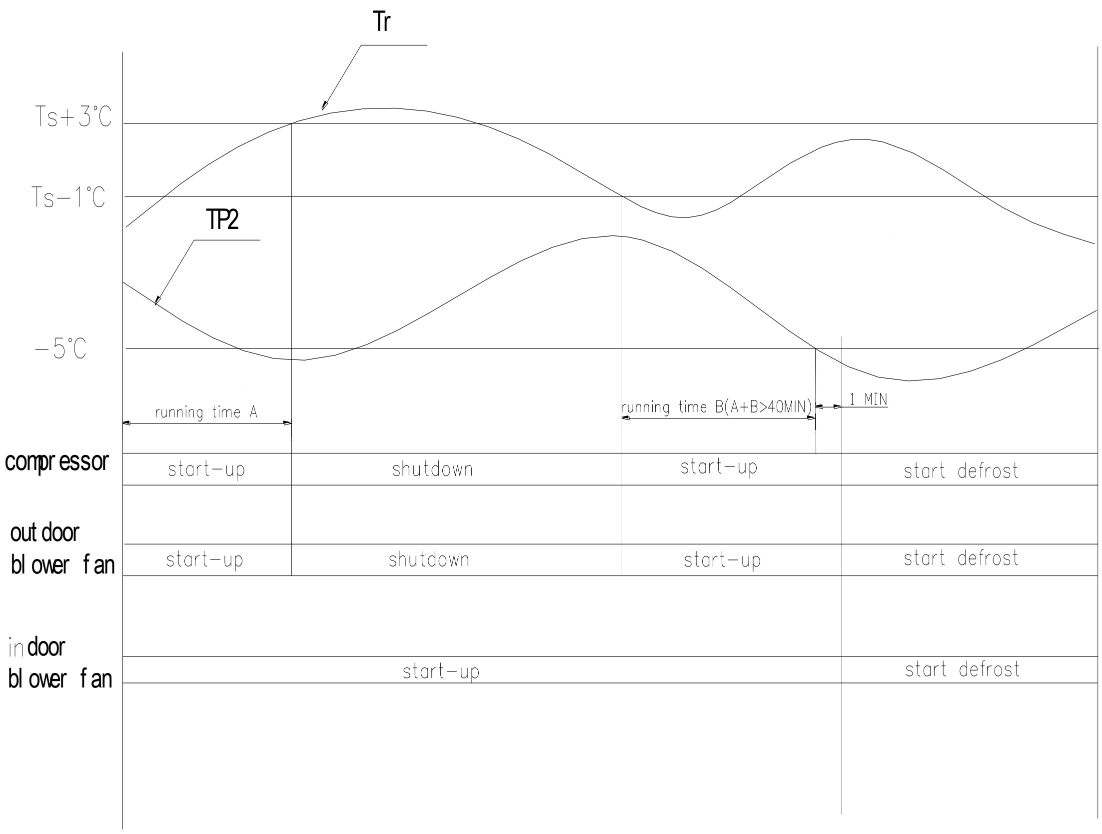
c. Air conditioner first power on or it wait over 30 minutes ,the temperature of coil pipe of the outdoor units is equal to or less than -2℃ (Tp_2≤-15℃)

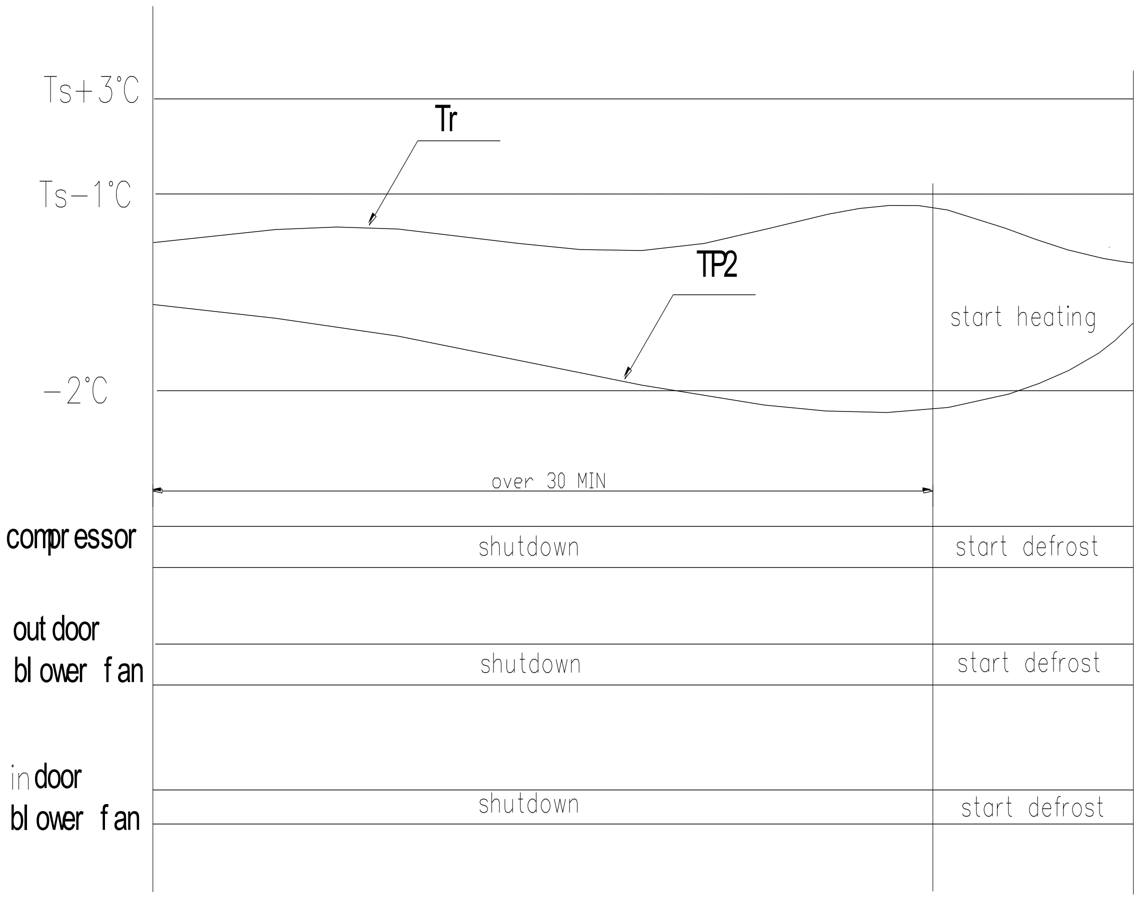
②end defrost condition(meet one of follows)

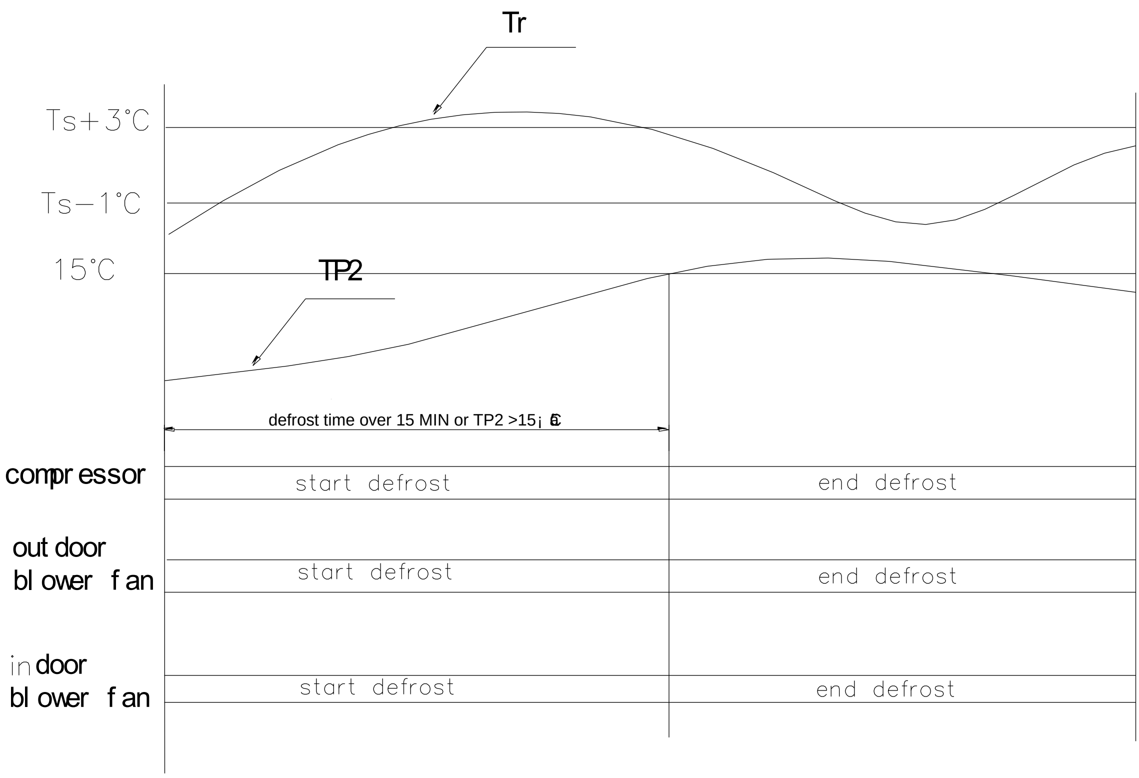
a. the temperature of coil pipe of the outdoor units is more than 15℃ (Tp_2≥-15℃).

b. defrost time have fifteen minutes.

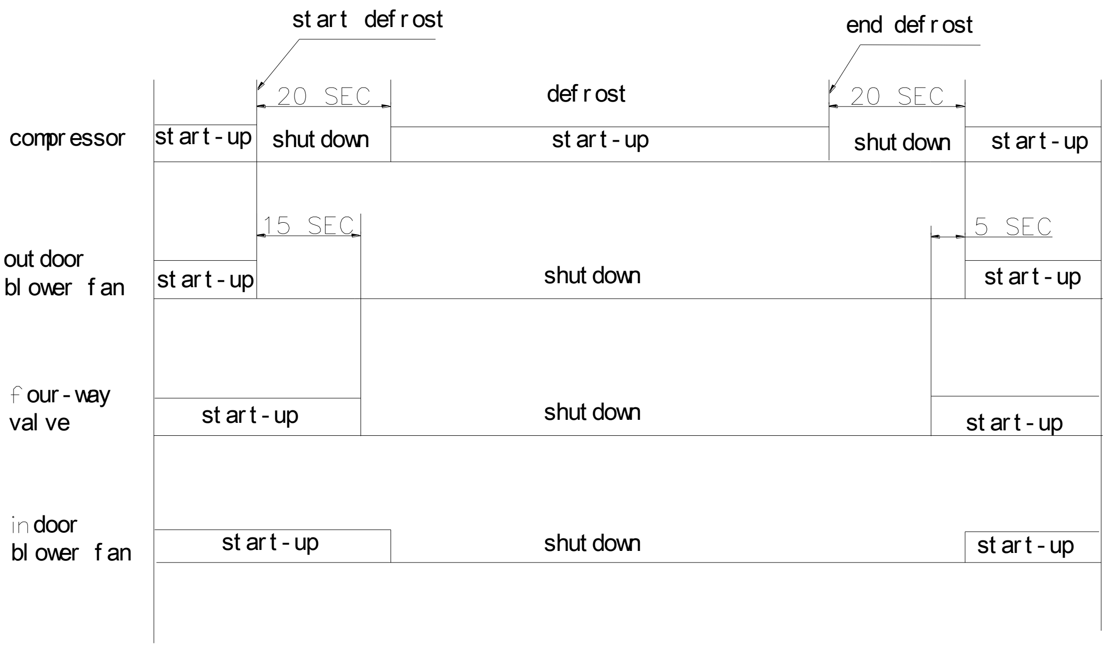



Tr
Ts+3°C
Ts−1°C
TP2
−5°C
running time A
running time B(A+B>40MIN)
1 MIN
compressor
start−up
shutdown
start−up
start defrost
out door
blower fan
start−up
shutdown
start−up
start defrost
indoor
blower fan
start−up
start defrost


Ts+3°C
Tr
Ts−1°C
TP2
start heating
−2°C
over 30 MIN
compressor
shutdown
start defrost
out door
blower fan
shutdown
start defrost
indoor
blower fan
shutdown
start defrost

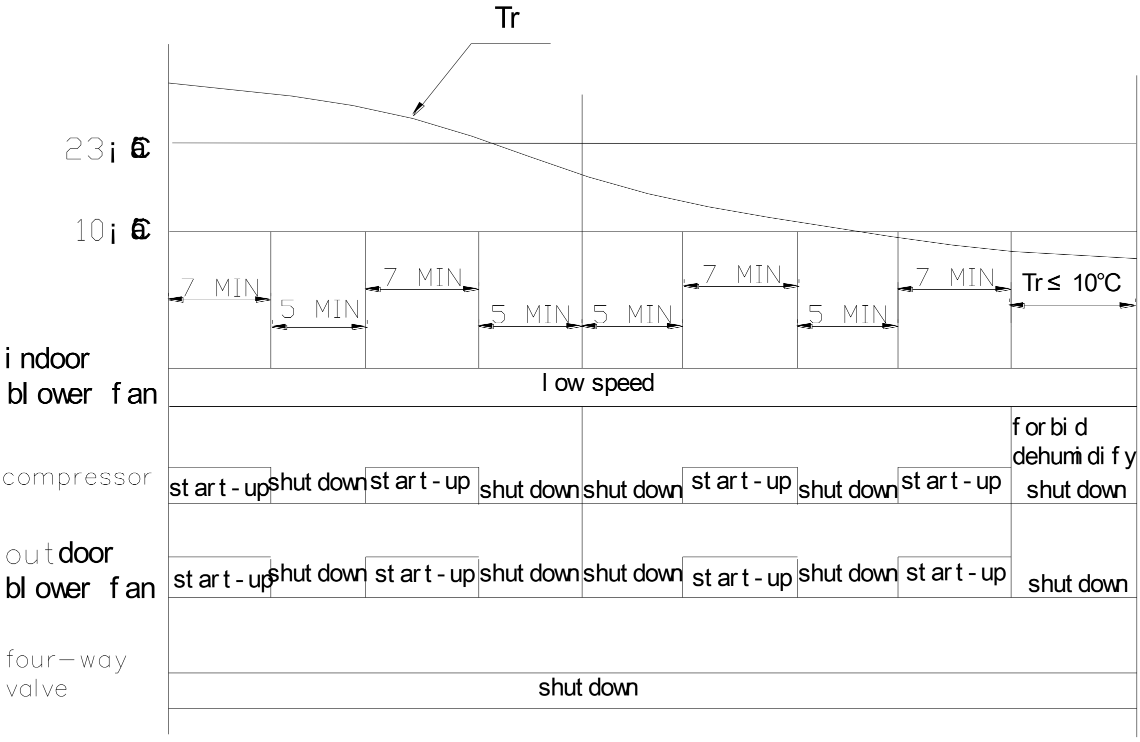


■ Sequence chart in defrosting mode



Dehumidification

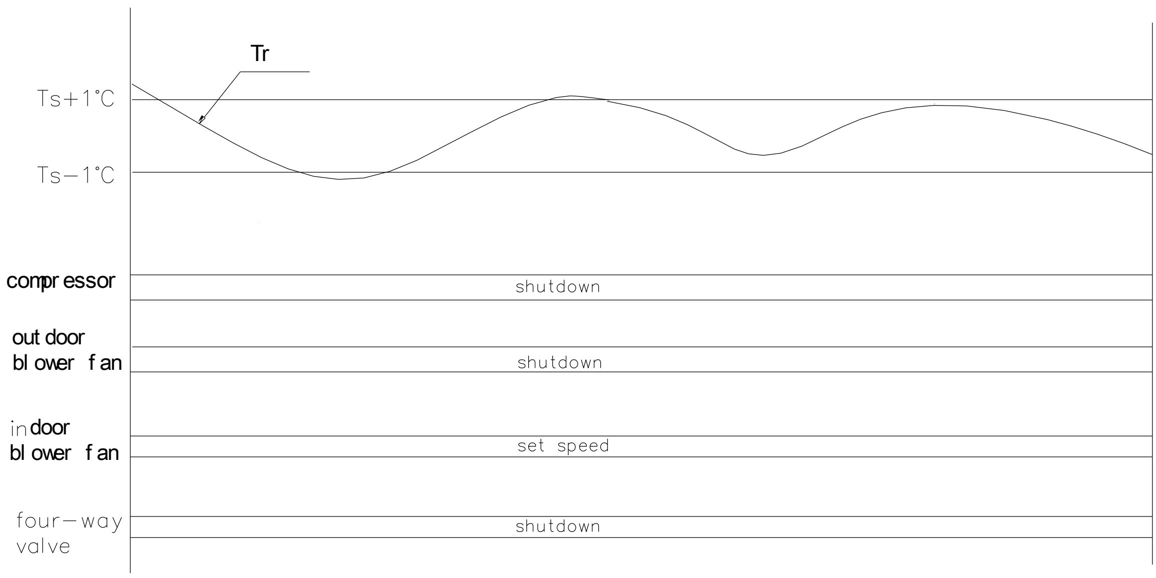
Dehumidification running is to eliminate the water vapor in the air by using the cool circulating capacity, but the dehumidification will not decrease the indoor temperature in great deal. The air conditioner automatically repeats on and off circulation according the room temperature, which is shown in the following figure.



- In the dehumidification mode, the indoor fan is running at the low speed for twenty seconds at first, then it select working mode.

Ventilation working mode (only applicable to single cooling unit)

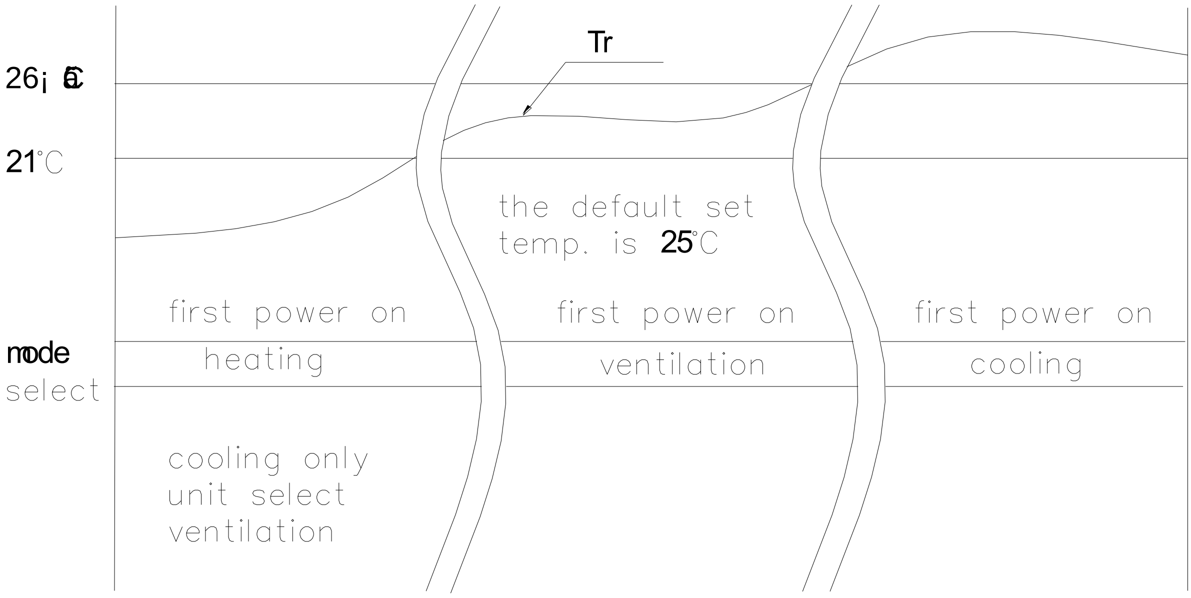
In the ventilation mode.When ventilating, the compressor, outdoor blower fan, four-way valve and electric heating are all closed and the indoor blower fan is running at the set speed.



Automatic mode

- Conditions for entering the automatic running mode are: After power-up for the first time, start up and select the automatic operating mode of remote or press emergency key, the working mode depends on Tr and if the working

mode had set , it doesn't change by Tr and the default set temperature is 25 ℃.



auto mode select at
first power on

Time on and time off

When the time on or time off is used, the clock of remote controller shall be corresponding to the current clock and the timing times is less than or equal to 24 hours, when the timing time is reached, unit will start-up or shutdown.

Sleep function

When the sleep key is press, air conditionerenter sleep state, indoorblower fan running at low speed, only sleep indication display.

Emergency key function

There is a forcible execution key on the panel of indoor units and the air conditioner can run by pressing the key when the remote control is out of work or missing.

When pressing down the forcible execution key, then power up and enter the self-check program.

Failure display

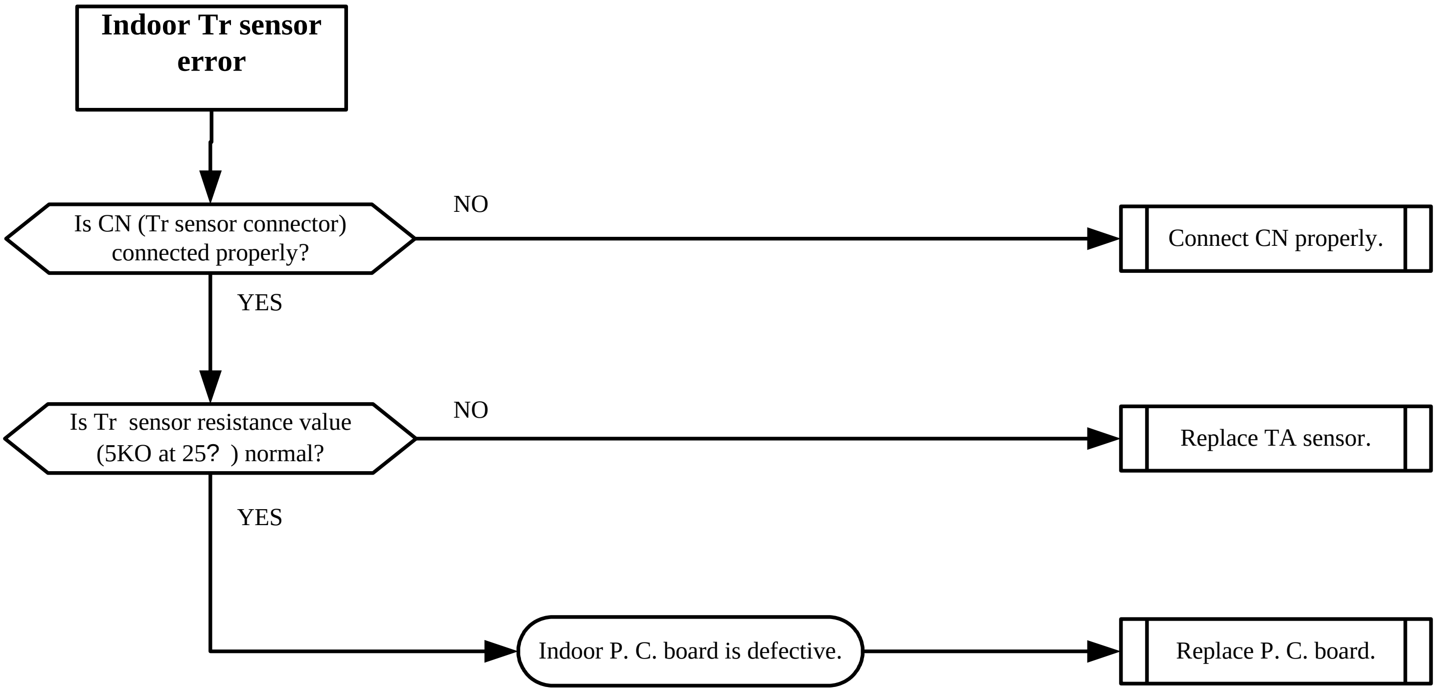
LED		lamp display		failure	The reason of fault and solution
code	explain	code	explain		
DF	display at	flicker 1/1		defrost	Normal, the defrost state is removed, it will return to normal condition automatically

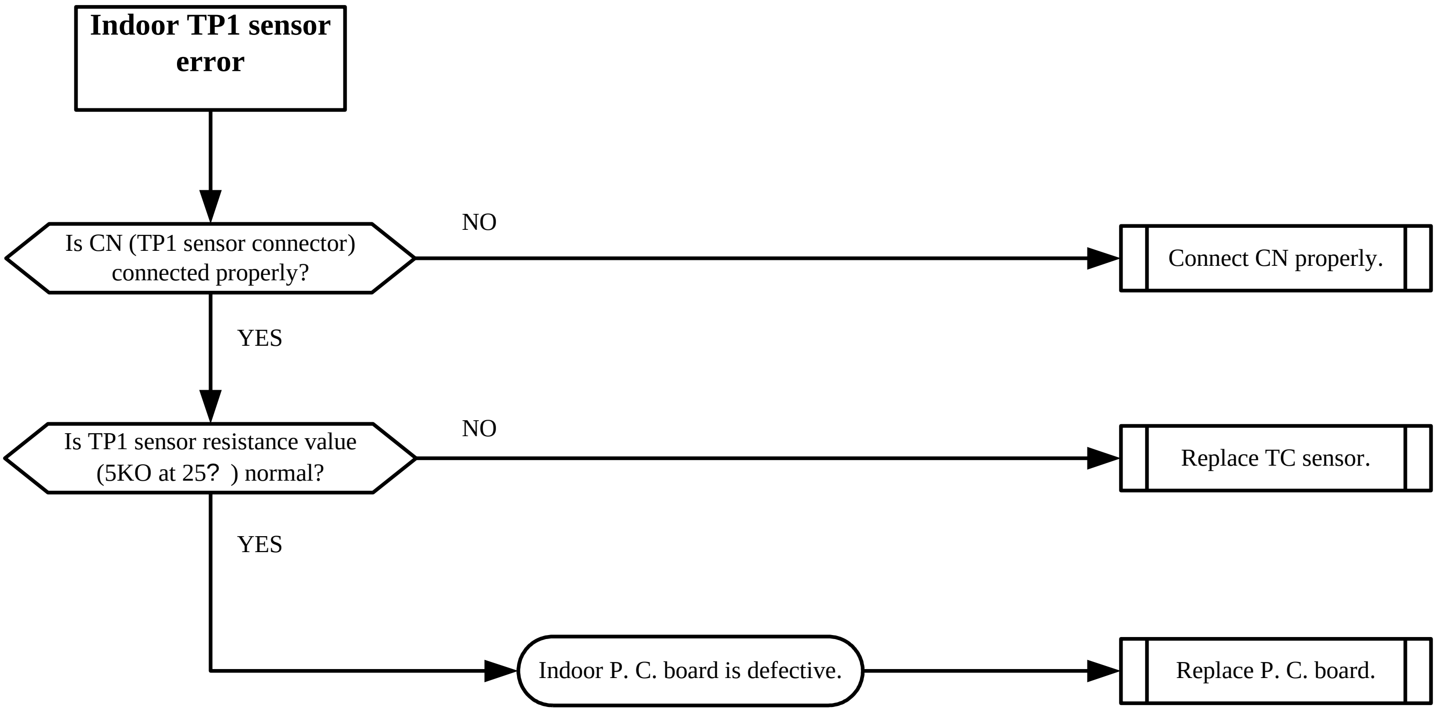
	on state	SEC		indication	
	display at off state	flicker 1/3 SEC		anti cold wind	1、Normal (during heating mode) 2、It will be removed when the coil pipe temperature sensor reaches certain temperature.
E2	display at off state	flicker 1/1 SEC	display at on/off state	room temp. sensor fault	1、Check whether the resistance of the sensor is normal (the resistance is 5KΩ in the normal temperature 25℃), when it is abnormal the sensor should be replaced. 2、Check whether there is short circuit or open circuit in the wire of the sensor, and whether the plug is connected well, whether there is welding off or rosin joint on the electric control board, if there is any, it should be repaired. 3、When the 1 and 2 are both normal, then the components or integrated circuit is damaged, the electric control board should be replaced.
E3	display at off state	flicker 3/5 SEC	display at on/off state	coil temp. sensor fault	1、Check whether the resistance of the sensor is normal (the resistance is 5KΩ in the normal temperature 25℃), when it is abnormal the sensor should be replaced. 2、Check whether there is short circuit or open circuit in the wire of the sensor, and whether the plug is connected well, whether there is welding off or rosin joint on the electric control board, if there is any, it should be repaired. 3、When the 1 and 2 are both normal, then the components or integrated circuit is damaged, the electric control board should be replaced.
E4	display at on/off state	flicker 4/6 SEC	display at off state	outdoor unit abnormal	1、Check whether the winding resistance and operation current of the compressor are normal. 2、Check whether the high and low pressure is normal when the unit is running. 3、Check (whether the coil pipe sensor is normal) whether the contact of the inserter on the circuit board is well, the coil pipe temperature sensor is fixed, the evaporation of the indoor unit is well,

					the key is to check the evaporator temperature detected by the coil pipe temperature sensor has reached the cooling or heating temperature. 4、Check whether the surface of the condenser is too dirty, it should be cleaned when it is too dirty. 5、Check whether the capacitance of the outdoor motor and the fan is damaged, it should be replaced when it is damaged. 6、If the above items are normal, the electric control board should be replaced.
E5	PG motor display at off state	flicker 5/7 SEC	display at off state	no feedback signal of indoor fan	1、Check whether two sets of plugs on the outlet end of the motor have loosed from the socket of the electric control board, insert it firmly when loosing. 2、Check whether the indoor motor has damaged, the motor should be replaced when it is damaged 3、Check whether the controllable silicon and other components on the electric control board have damaged, replace the controllable silicon or electric control board when they are damaged.
E6	PG motor display at off state	flicker 6/8 SEC	display at off state	no over zero signal	1、Firstly check whether the indoor fan is normal. 2、Check whether the signal outputting from the integrated chip of the electric control board is normal, the electric control board should be replaced when the signal is abnormal.
E7	display at off state	flicker 7/9 SEC	display at off state	outdoor feedback fault	1、Check whether the winding resistance and operation current of the compressor are normal 2、Check whether the high and low pressure is normal when the unit is running. 3、Check whether the indoor and outdoor wiring is right; when it is wrong, connect them again according to the circuit diagram 4、Check whether the contact of the inserter on the circuit board and the connection are well, otherwise repair. 5、Check whether the signal feedback wire is

					disconnected, replace or connect the feedback signal wire. 6、Check whether the supply power is phase-lacking or phase opposition. 7、Check whether the AC electromagnetic contactor is well.
E8	display at off state	flicker 8/10 SEC	display at off state	frost protection/over heat protection	1、Check whether the filter of the indoor unit is dirty or blocked, and clean if it is dirty. 2、Check whether the indoor fan is running normally, and replace the motor if it is abnormal. 3、Check whether indoor pipe temperature sensor is normal, and replace the sensor if it is abnormal. 4、Check whether the system pressure is normal, if abnormal, should check whether there is leakage, and fill the refrigerant again.

10. TROUBLE SHOOTING



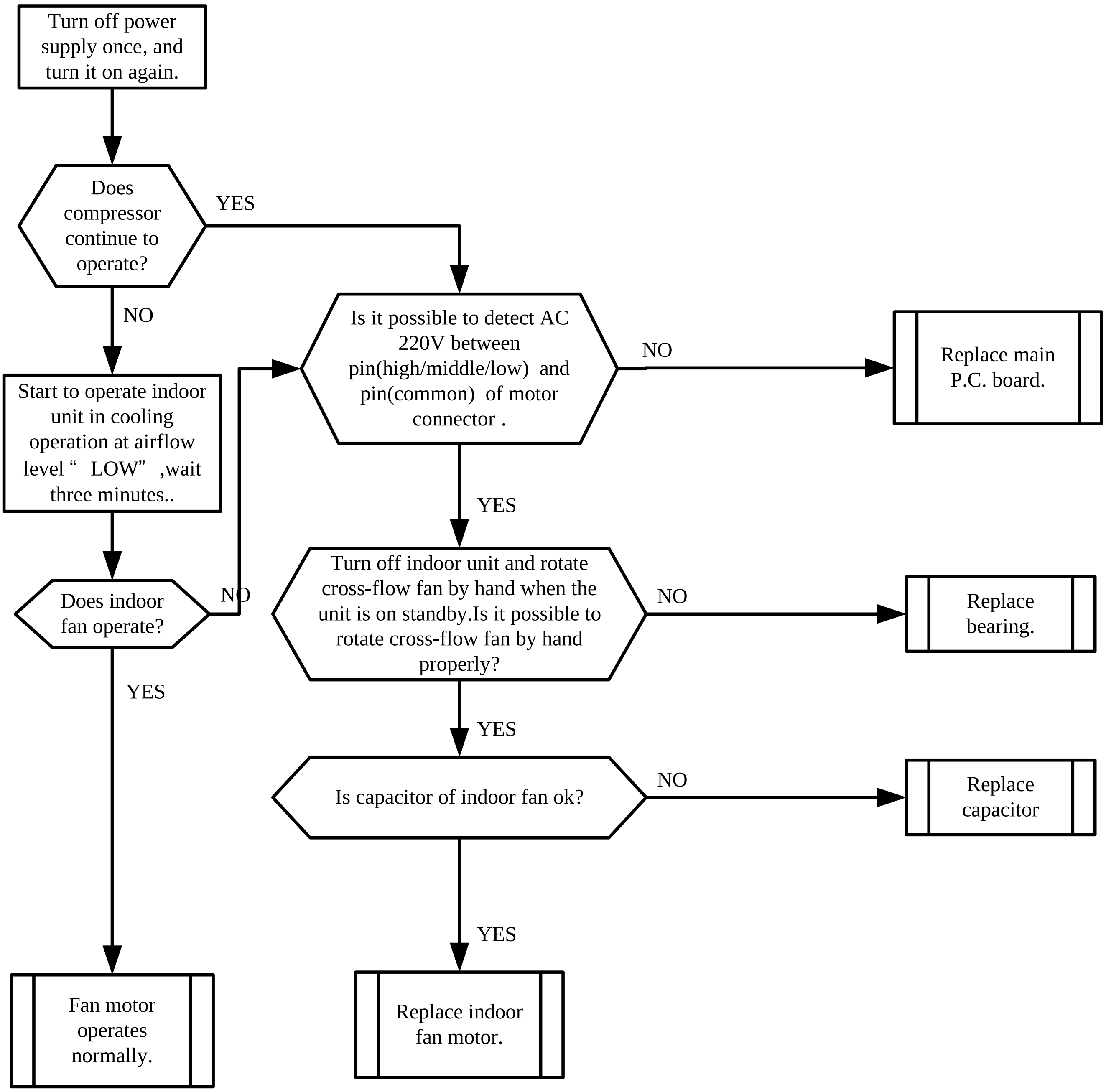


Only indoor fan motor does not operate.

<Primary check>

(1) Is it possible to detect the power supply voltage (200-240V) between L and N on the terminal block?

(2) Does the indoor fan motor operate in cooling operation?

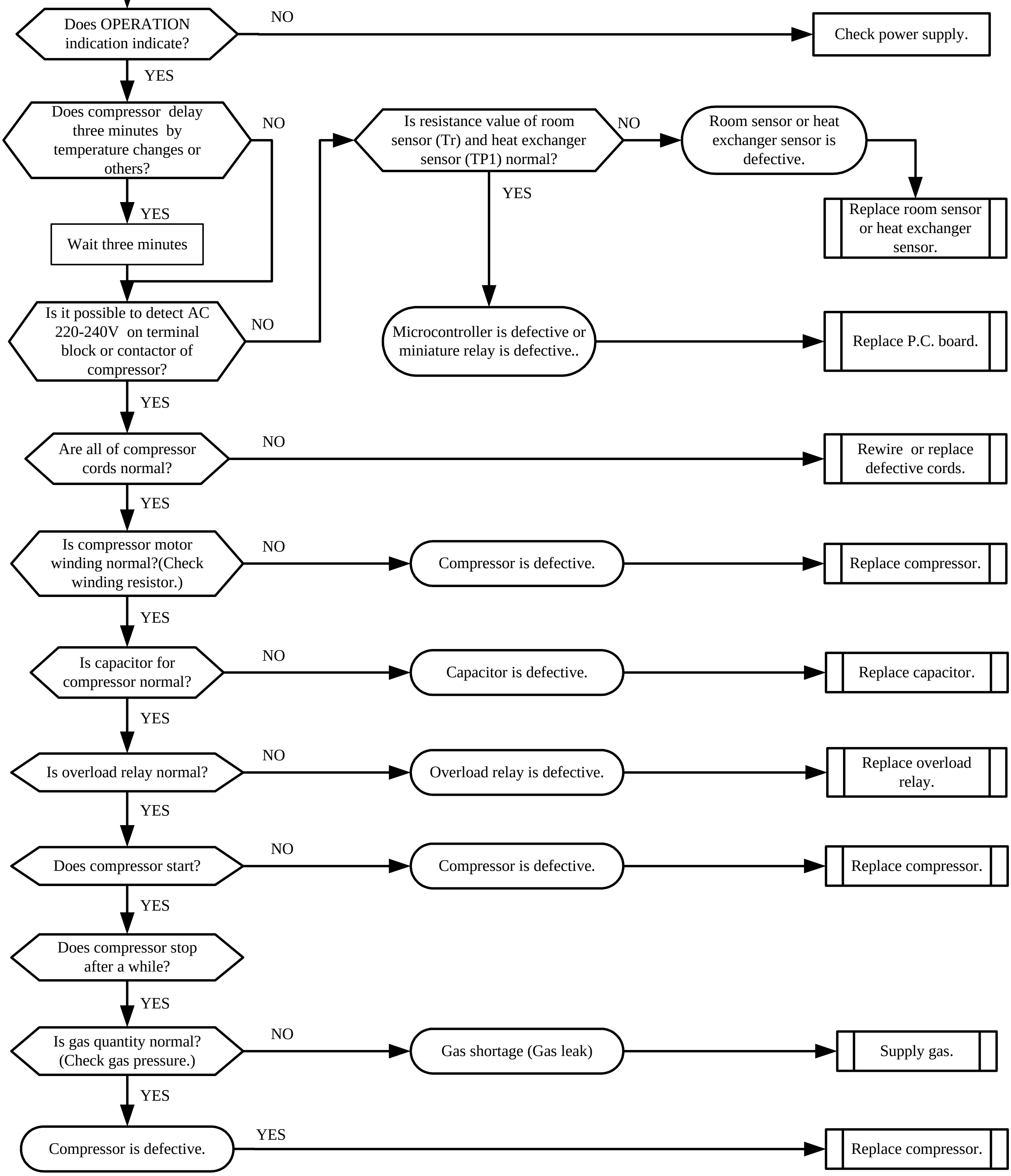


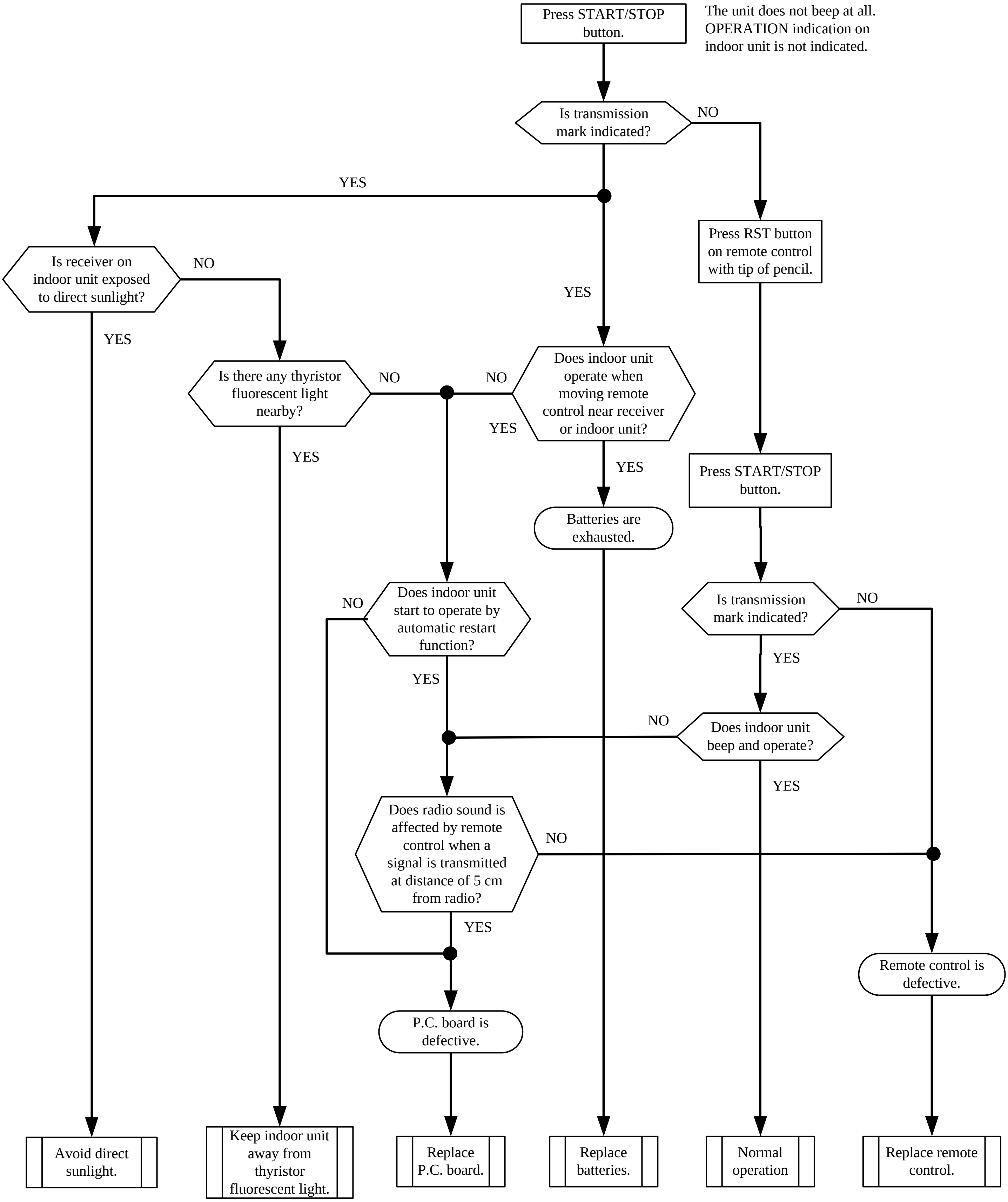
Compressor does not operate.

<Primary check>

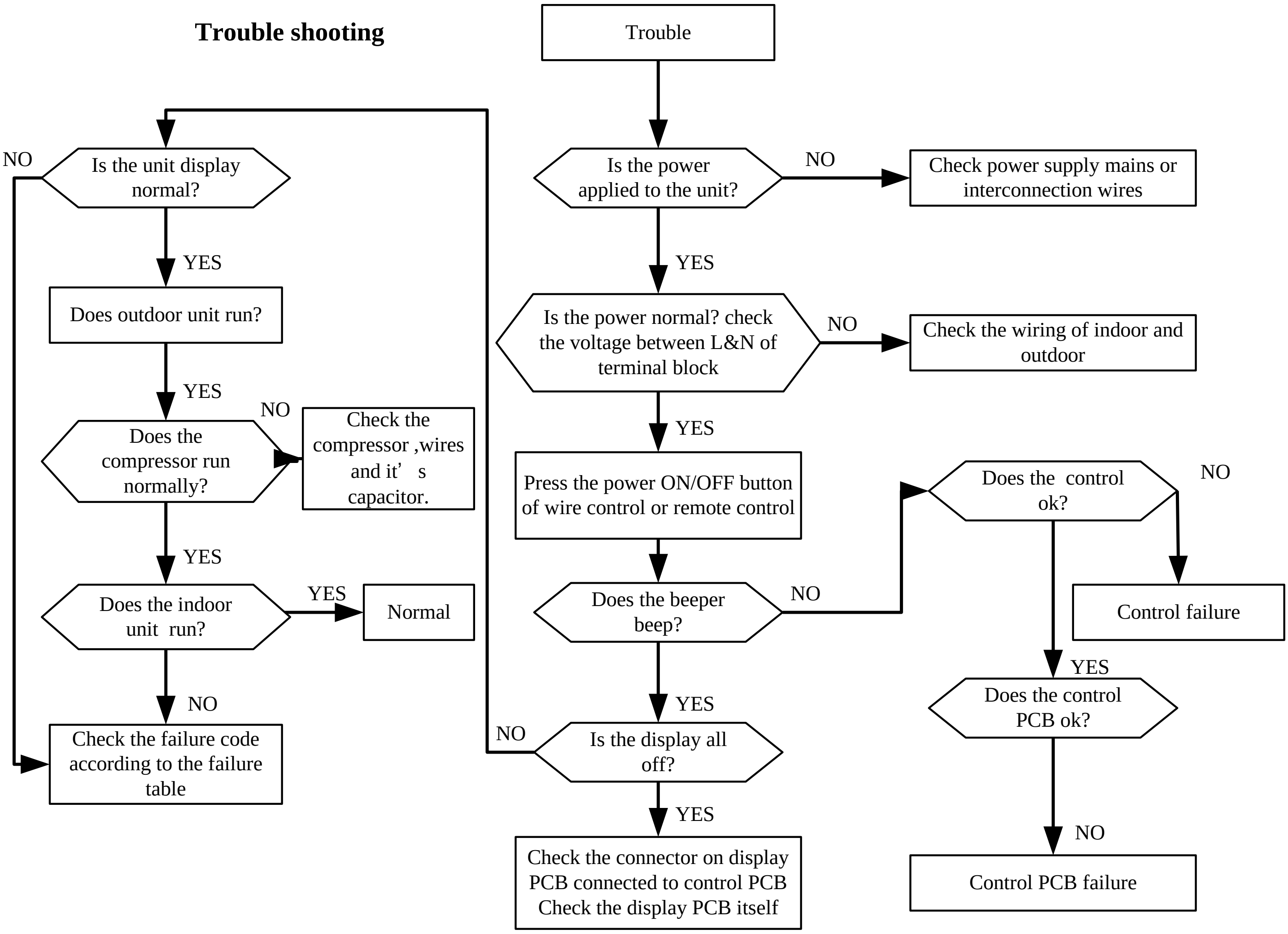
(1) Is the room temperature higher than the preset temperature in cooling operation?

(2) Is the crossover cable connected properly?




Press START/STOP button.
The unit does not beep at all. OPERATION indication on indoor unit is not indicated.
Is transmission mark indicated?
NO
YES
Press RST button on remote control with tip of pencil.
Is receiver on indoor unit exposed to direct sunlight?
NO
YES
YES
Is there any thyristor fluorescent light nearby?
NO
NO
Does indoor unit operate when moving remote control near receiver or indoor unit?
YES
YES
YES
Press START/STOP button.
Batteries are exhausted.
NO
Does indoor unit start to operate by automatic restart function?
Is transmission mark indicated?
NO
YES
YES
NO
Does indoor unit beep and operate?
YES
Does radio sound is affected by remote control when a signal is transmitted at distance of 5 cm from radio?
NO
YES
Remote control is defective.
P.C. board is defective.
Avoid direct sunlight.
Keep indoor unit away from thyristor fluorescent light.
Replace P.C. board.
Replace batteries.
Normal operation
Replace remote control.

Trouble shooting



Indoor unit and outdoor unit don’ t operate

